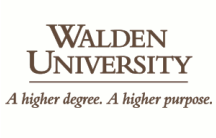

2015

A Case Study of a University's Remedial Program for Passing the Praxis I

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COLLEGE OF EDUCATION

This is to certify that the doctoral study by

Tassi Brinkley

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
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Abstract

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MA, Murray State University, 2001

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Project Study Submitted in Partial Fulfillment

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Abstract

Underprepared students desiring to enter teacher education programs struggle to achieve minimum state-required Praxis I exam scores. This problem affects teacher education programs, student success, and university enrollment and retention. With proper resources and support, these students may experience personal and academic success that may be transferred to their own students once they are certified teachers. At the participating mid-South university, the effectiveness of the existing remedial program was unknown. The study's purpose, rooted in the constructivist learning principles of Dewey and Bruner, was to address the effectiveness of the local university's existing remedial program in assisting the teacher education students in meeting state testing requirements. In this qualitative case study, existing deidentified student Praxis I scores (n = 41), archived remedial course information and departmental records, and deidentified course grades were analyzed descriptively and collectively to determine the effectiveness of the remedial program. All data were coded and analyzed for patterns to reveal problems or resources relative to student performance. Key findings indicated that although the remedial courses addressed many Praxis I concepts, a redesign of the content and instructional approach may benefit underprepared students. Recommendations included using the data-based white paper produced from this study as a guide to improve remedial courses. This study may affect social change by providing an innovative approach to improve remedial programs to affect student achievement outcomes.

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Dedication

I dedicate this study first to God. Without His help, this would not have been possible; to God be the Glory. In addition, I dedicate this study to Billy Fite, my father, who encouraged me to continue my education. My father is with God, but his love and faith in me remains. I also dedicate this study to my granddaughters, Jaidyn and Emmalyn; may they have the drive and determination to seek their own dreams.

Acknowledgments

Without the assistance of many, this study would not have been possible. The patience and support of my husband, Michael, my son Brandon, my daughter-in-law Sarah, my mother Sue Fite, and my granddaughters, Jaidyn and Emmalyn were unwavering.

I would like to acknowledge those who have provided encouragement, advice, and proofreading. Dr. Paul Thompson, department chair, was supportive and his advice was helpful. Administrative assistant, Nancy DeJournett, was instrumental in assisting me on the journey through my doctoral degree. She was always reading to improve the wording in my paper, especially finding and fixing passive voice! Without the help of Mrs. D, I would never have accomplished my goal.

Ben Graves and Ray Lyttle assisted in finding articles in the library and archives. Both actively sought articles and books when I asked for them.

Tim Fite, Cathy Richard, Dr. Stephen Wilson, and Shanda Fite were also great help.

Table of Contents

List of Tables

Section 1: The Problem

Introduction

Remedial programs have been a component of colleges and universities since the beginning of higher education (Bettinger & Long, 2004). There are many different remedial programs used in all levels of education (Bettinger & Long, 2009). Remedial programs have had a long and complicated history in college and university settings (Bettinger & Long, 2004). Currently, schools use many remediation programs and strategies, but little research exists indicating which ones are most effective in remediating underprepared teacher education students (Berry, Daughtrey, & Wieder, 2010). Berry et al. (2010) recognized a lack of research concerning the benefits for teacher education students. A significant concern was a disconnect between research and application, which caused valuable information to be overlooked, resulting in students failing to receive potentially valuable services (Berry et al., 2010).

Students in the local setting of this study faced two issues regarding admission to the Teacher Education Program (TEP). The first was lack of preparedness of students desiring admission as demonstrated by low-test scores. This problem was exacerbated by the Commonwealth of Kentucky's recent increase in admission requirements. The local setting was not the only area of higher education affected by this problem. National and statewide documentation provided evidence of the prevalence of underprepared students attempting admission into college programs, especially TEPs (KDE, 2014).

National Implications

Nationally, significant numbers of students arrive at colleges and universities underprepared for a college educational program (Tritelli, 2003). The American Association of Colleges and Universities (AACU) reported that "53% of students entering United States colleges and universities were academically underprepared, i.e., lacking basic skills in at least one of the three basic skills areas of reading, writing or mathematics" (as cited in Tritelli, 2003, p. 2). The ACT (prior to 1994, known as the American College Test) annual report for the 2010 school year indicated that approximately 25% of the students who graduated high school were adequately prepared for college level work in any of the ACT tested sub-areas (reading, English, mathematics, and science skills).

State Implications

Officials in the state of Kentucky designed a task force that addressed the issue of underprepared students exiting high schools (Kentucky Developmental Task Force, 2007). The anticipated result of proposed legislation for higher standards in P-12 education was a decrease in the number of underprepared students entering higher education. While the new mandates may help future students, they do nothing to assist the underprepared students currently seeking admission to colleges and universities. A specific area of concern for the Educational Professional Standards Board (EPSB) was the lack of preparedness of candidates entering the TEPs across the state. In an attempt to reach the goal of preparing teachers who will produce better prepared students, the EPSB set new standardized test mandates for admission to TEPs. Prior to the changes of

September 1, 2012, teacher education departments required an ACT composite score of 21 or scores of 170 in reading and writing and 172 in mathematics on the Praxis I, Pre-Professional Skills subtests. Effective September 1, 2012, ACT scores were no longer accepted. All candidates were required to take the Praxis I and meet the revised minimum scores of 174 on the reading subtest, 174 on the writing subtest, and 173 on the mathematics subtest. Students were not able to meet the original minimum scores, and the increase in required minimum scores exacerbated the problem of students being unable to meet the requirement.

Local Implications

Over the past 4 years, the teacher education department of a small Kentucky university experienced an increase in the number of interested students ineligible for admission to the TEP because of inadequate Praxis I scores. The former prerequisite testing requirement of an ACT composite score of 21 was problematic for these students, and scoring the previous minimum of 170 in reading and writing and 172 in mathematics for the Praxis I equivalent was a barrier. With the increase in the required minimum scores on the Praxis I and the elimination of the ACT composite, the number of interested but ineligible applicants to the TEP increases each semester (Faculty 1, personal communication, September 18, 2012). It became apparent on the local level that intervention was needed to assist the students in developing the basic skills needed to reach the minimum scores on the Praxis I subtests. Many of the ineligible students were student athletes who were first generation college students and were often from lower socioeconomic statuses (Faculty 1, personal communication, October 10, 2012). In order

to produce highly qualified teachers, TEPs must acknowledge and address the problem of underprepared students. Appropriate remediation could assist many marginal teacher education applicants in surpassing the standards for entry into the TEP. The local university needed to determine if the current remedial efforts were beneficial in assisting students in mastering the content on the Praxis I subtests. Accomplishment of the study's purpose required analysis of the existing curricular content of the four remedial courses and aligning it with the required Praxis I content. Analysis of the questions from the Praxis I practice exam allowed a comparison of content skills tested to content skills instructed in the remedial courses available at the local university.

In this case study, I investigated the local problem and the concerns with student progress and admittance to the local TEP. This section specifically provides a definition of the research problem; the national, state, and local implications; significance; and research questions derived from the literature related to this problem.

Definition of the Problem

Underprepared students were unable to meet minimum requirements set by state EPSB for formal admission to TEPs. Many underprepared students could become eligible for the TEP with appropriate remediation. The problem was that the effectiveness of the existing remedial program was unknown. This problem affected TEPs, underprepared students seeking this major, and university enrollment. Many possible factors contributed this problem, including the diversity and needs of underprepared students, the state TEP requirements, and remedial program components such as instructional methods, targeted

skill sets, or curriculum objectives. It was unknown whether remedial courses offered on the local campus addressed key aspects of the Praxis I.

Rationale

Evidence at the Local Level

Underprepared students populated the TEP at a local university. Although underprepared students were not unique to other colleges and universities, the local setting received significant negative effects. Enrollment in TEP dropped, the number of students eligible to enter into TEP courses resulted in a significant drop in course enrollment (Professional 1, personal communication, April 2012). Many educators were concerned about this problem, including teachers, administrators, and university personnel (Professional 1, personal communication, April 10, 2012).

Demographics. The setting was a small, Christian university in a Southeastern state. The university opened in the 1930s. It began as a college for ministers. Since the founding of the university, it has grown to offer associate's, bachelor's, and master's degree programs and has dormitories on the campus. The cornerstone of the university is Christian doctrine. All aspects of the university reflect the commitment to Christian principles. The university had a student body of approximately 3000. Most of the students enrolled were adult students in degree completion cohorts; many of the cohorts met in off-campus/satellite locations. There were about 300 traditional students (18-25 years old, enrolled in mostly daytime courses). Approximately 225 of the 300 traditional students lived on campus and formed a diverse group representing many different countries and states. Most students were also athletes receiving scholarships. The teacher

education courses took place only on the main campus during daytime hours. The diversity of this group produced cultural and ethnic barriers, especially to standardized exams, which were relevant to this local problem.

The local university, though small, was diverse. Internal institutional documents in the TEP identified a diverse TEP student base of 2011 students. The small size of the TEP made it difficult to identify trends in student demographics. There were minority students and international students in the participant pool; however, the number was too small to make any assumptions from the demographic data. With the economy in crisis and unemployment on the rise, many of the college students were adults who needed to further their education to be equipped for future job demands (Rose, 2010). Across the campus, the population of students over 25 years of age was small, but in teacher education adult students accounted for 25% of enrollment (Faculty 2, personal communication, April 12, 2012). Many adults who returned to college found teacher education a good fit for the demands of family living (Admissions 1, personal communication, October 2012). The TEP courses took place during traditional hours because courses required candidates to visit and participate in elementary classrooms.

In order for a TEP to remain in operation, students must gain admission to the program. Many underprepared students demonstrated desirable teacher traits such as classroom presence and a true passion for teaching, but these students needed assistance to meet test standards. The primary requirement that students were unable to meet was the Praxis I exam. Without admission to the program, the students could not declare the ETE major and could not benefit from appropriately trained advisors. The students were

not prepared for college level course work based on high school performance, standardized test scores, and/or university placement test scores.

To provide appropriate advising and direction, even in remediation for TEP admission, the university added a new major: Pre-Elementary Teacher Education (PETE). By creating the PETE major, the university enabled students to be assigned an elementary teacher education advisor as freshmen regardless of their test scores. Transfer students interested in teacher education were assigned advisors in teacher education and classification as PETE majors regardless of their previous academic performance or test scores. Declaring a major was important: NCAA athletes had to declare a major by sophomore year for eligibility, and financial aid requirements required sophomores to declare a major (Faculty 1, personal communication, January 16, 2010). Because most students did not meet state test-score requirements by their sophomore year (Faculty 1, personal communication, September 12, 2011) the PETE designation allowed students to attempt to meet state requirements while working toward achieving all requirements.

The local instance of underprepared students attempting to be successful in college was significant. Approximately 70% of the current students advised by the teacher education personnel did not meet eligibility criteria for formal admission to the program. The EPSB eliminated the ACT composite score requirement in favor of minimum score requirements on the reading, writing, and mathematics portions of the Praxis I. The state of Kentucky determined the Pre-Professional Skills Test (PPST), or Praxis I, to be better suited to evaluate basic skills needed for TEPs. According to data collected by the local teacher education department, the students had a marked lack of

preparation as evidenced by their ACT scores, high school performance, and scores on the Computer-Adaptive Placement Assessment and Support System (COMPASS) college entrance exam. Student test scores on standardized tests at the local university provided evidence of student underpreparedness.

Test scores were important to the teacher education department because students have state-mandated requirements. According to the admissions department head, the ACT scores for 67 incoming freshmen for the year 2011-2012 averaged 20.1 with a range of 12 to 30 (Admissions 1, personal communication, September 12, 2012). Eighteen of the 67 students who requested teacher education advisors scored an average composite score of 17.1. Only two of the 18 students desiring teacher education admission had a composite ACT score of 21. As a result, 10 of the 18 students were encouraged to take a remedial course; the college did not require the remaining six students with an 18 or 19 to take a remedial course (Admissions 1, personal communication, January 18, 2011). Similar deficiencies were anticipated on the Praxis I, considering that the ACT was comparable in content and ability level. All of the evidenced deficits showed a marked need for some type of remediation to compensate for the underpreparedness.

Existing remediation. The local university did not offer any type of remediation geared toward Praxis I skills. In the past, instructors in the Teacher Enrichment remedial course attempted to assist students in studying for the Praxis I/ACT; however, because the course did not help to increase students' scores, it was discontinued. There were four remedial courses designed to help students gain TEP admission: two for basic mathematics, one for English grammar, and one for writing improvement. One

mathematics course and the English grammar course included computer-based tutorials that required self-directed learning. Students in the writing improvement course met with an instructor, but focused on English usage issues rather than skills practice. International students, many of whom were English as second language (ESL) students, largely populated the writing improvement course. This demographic affected the course's appropriateness to prepare candidates for the writing and grammar portions of the Praxis I. ESL learners have different needs than those who simply need to reacquaint themselves with skills. Additionally, the courses did not offer credit toward a degree; the credits counted only for student athlete and financial aid purposes. These circumstances indicated a need for content alignment between the Praxis I and the course content. Ensuring alignment was paramount to assist prospective elementary education majors in meeting minimum scores on the Praxis I.

Officials at the local university had not formally evaluated their remedial courses or teacher candidate Praxis I scores to determine the impact of these remedial efforts. The raw data existed on student Praxis I practice test results but had not been analyzed. Analysis of the data made it possible to determine the needs of the students. Analysis of Praxis I practice test questions and the content presented in the questions allowed connections to be made between student needs and content in the remedial courses, and whether the two were aligned. The teacher education chair wanted to determine if a change in the current remedial courses would benefit education students' needs (Faculty 2, personal communication, February 11, 2012). The administration was concerned about offering better opportunities to teacher education students. In order to meet state

mandates, the current remedial programs needed to align with the Praxis I objectives and content. This study's purpose was to determine what should be altered to increase students' Praxis I scores.

For the continuing cycle of underprepared students to be broken, teacher education professionals needed to address the issue of remediation. The long-term benefits of students receiving remediation were not often compiled so that specific investigations of existing remedial programs on local campuses could identify areas of improvement (Wang, O'Dell, Klecka, Spalding, & Lin, 2010). Existing research suggested that some non-traditional remedial programs enhanced student performance (Parker, Bustillos, & Behringer, 2010).

State and National Evidence

Although this study primarily focused on teacher education students, there was an identified need for remedial programs for beginning college students. Based on composite scores on the ACT annual reports (2010, 2011), students were not prepared for college when exiting high schools. The ACT (2011) indicated that students achieving a 21 composite score have a 50% probability of obtaining a "C" in credit-bearing college courses. Significant numbers of students gained admission to the local college with scores below a 21 composite (Admissions 1, personal communication, January 16, 2011).

State Issues

Compared to national norms, Kentucky ACT composite score results mirror national norms in lack of overall change from year to year. The primary difference was that Kentucky's scores remained significantly lower than the national scores. Analysis of

ACT composite scores for the last 2 years indicated only 13-14% of high school graduates had the basic skills necessary to achieve a "C" in credit-bearing college courses (KDE, 2013). Based on the readiness data compiled by the KDE, approximately 34% of Kentucky graduates from the class of 2010 were marginally ready for college courses and at least half of that 34% required remediation to be successful (KDE, 2013).

Kentucky officials, in accordance with national initiatives, revised core course content and increased high school graduation standards to reduce the number of future underprepared students (KDE, 2013). As standards received adjustments for Kentucky public schools, there were plans to overhaul teacher preparation programs within the state (KDE, 2013). The anticipated result of better prepared students guided the various education reforms on national, state, and local levels. While the anticipated result was admirable, colleges must do something to assist the underprepared students already enrolled.

The Kentucky Department of Education task force addressed student success and attempted to safeguard the quality of future teachers. The final report of the Developmental Education Task Force, *Securing Kentucky's Future: A Plan for Improving College Readiness and Success* (2007) indicated that Kentucky shared the national challenge to do two key things: (a) reduce the number of underprepared traditional and nontraditional students coming to postsecondary education and (b) improve the success rates of underprepared students admitted to Kentucky institutions. The task force, together with national representatives, suggested six core recommendations with dramatic anticipated outcomes: (a) updating and reforming

college admissions regulations, (b) providing additional funding to institutions that work jointly with higher education to reduce underprepared students, (c) funding an infrastructure improvement for postsecondary schools, (d) aligning college readiness standards and tying these standards to educator professional development, (e) improving the link between educator preparedness and college readiness, and (f) developing early student interventions. These recommendations were to be implemented by the end of 2012 (Kentucky Developmental Task Force, 2007).

This development significantly affected the scope of my study. With new state requirements, all teacher preparation programs were required to use the Praxis I; prior to this mandate most Kentucky colleges did not have any type of study course or remedial effort in place to assist students with skills acquisition for the Praxis I (Faculty 2 EPSB meeting, personal communication, April 12, 2012). In the state of Kentucky, there were 30 accredited teacher preparation programs. According to TEP faculty (Faculty 2, personal communication, April 12, 2012) from the 30 colleges represented at a statewide EPSB meeting in April of 2012, there were no remedial courses for Praxis I remediation at any college represented. All colleges represented offered remedial courses, but none of the courses focused solely on Praxis I skills. One small college had faculty who offered a 1-day workshop as a for-profit seminar, but had not offered it long enough to have conclusive evidence of its effectiveness (Professional 2, personal communication, April 11, 2012). A representative from Educational Testing Services (ETS) attended and noted that several computer tutorials were in the works, but most of the study materials and sample tests required payment in order to use them (Praxis Representative, personal

communication, 2012). Students in need of study but unable to provide credit card information could not use the website. Financial aid funds did not pay for tutorials but did pay for courses taken by the student. The Praxis I exam was not covered by tuition either. These factors were punitive to first-generation, low-income college students who could have benefited from the resource. The test was costly, and retaking tests with insufficient scores for admission was an expense that many students could not afford (Admissions 2, personal communication, 2012). Considering the importance placed on Praxis I scores by the Kentucky Department of Education, the EPSB requested viable suggestions to assist students who did not have basic skills to do well on the test (Professional 1, personal communication, 2012). Students were already requesting assistance with study materials for the Praxis I (Faculty 2, personal communication, 2012).

The implementation of Praxis I as a requirement allowed TEPs to focus on the acquisition of skills tested on Praxis I rather than all basic skills. Narrowing the focus of remediation allowed the remediation to be more beneficial to individual students. Looking at remedial programs on specific sites allowed Kentucky TEPs to fine-tune remedial efforts for their students and provided insight into program development/improvement for others in different venues.

Evidence of the Problem from the Professional Literature

Underprepared students: Diverse backgrounds. Not all students have the same academic background prior to college. Because of inconsistent availability of educational opportunities in their communities. Obstacles were present due to racial, economic, language, and other barriers. Provision for some type of remedial service to meet the

needs of underprepared students deserved exploration (Asera, 2006). Historically, minority students populated remedial courses, at least in part. Bias against minority students existed on many of the national norm tests used to set standards (Asera, 2006). The format and material tested caused difficulties for African American males (Asera, 2006). Another minority group was Latino students, many of whom had a language barrier (Shaw, 1997). Due to the specific challenges for some minority students, such as language barriers, cultural differences, and educational deficits, they needed remediation in test-taking skills (Ashburn, 2007).

Controversial perspectives on remediation. Remedial courses are part of the curriculum offered at most colleges and universities. According to government listings of college remedial courses offered, many educational researchers do not agree with remedial offerings (Wyatt, 1992). The educational researchers against remedial programs argue that underprepared students do not belong in college and should pursue alternative employment areas (Perez, 1998; Wyatt, 1992). Funneling underprepared students into alternative careers may fix the educational side of the problem, but this does not allow underprepared students to become highly productive members of society (Perez, 1998). Many blue-collar jobs require higher literacy skills that underprepared students do not possess. According to McCabe (2003), many future jobs will require college-level skills. With the economic crisis, the issue of higher education used as a means to better one's self increased the need for remedial programs. In order for the U.S. to compete in the global economy, American colleges and universities must be proactive in addressing the needs of all students, especially those who are underprepared.

State connections. In accordance with national educational reform efforts, Kentucky educational personnel addressed the issue of underprepared students on the state level. Kentucky had educational deficits for decades and began to combat the deficits by creating the Kentucky Educational Reform Act (KERA) in the early 1990s. Because of KERA, the state department of education has striven to advance the number of Kentuckians with college degrees. One key component of Kentucky's educational reform was the initiative to place highly qualified teachers into teaching positions in Kentucky schools. The EPSB installed more stringent admissions criteria for TEPs, including the move away from the ACT toward the Praxis I.

EPSB personnel postulated that if teacher candidates were better prepared at the beginning of the TEP (demonstrated by standardized test scores), by the conclusion of the TEP teachers would be well prepared (EPSB 1, personal communication, 2010). To ensure that students applying for admission to TEPs possessed a basic level of skills and content knowledge, minimum scores on nationally recognized tests were required. Academically underprepared students had difficulty meeting the standardized test requirement.

Because students had problems meeting standardized tests scores, the increased minimum score requirement and change in tests resulted in additional barriers for underprepared students. An EPSB member (Professional 1, personal communication, January 11, 2012) informed me that any project that promoted success on the Praxis I would be beneficial to any college in Kentucky. Because the Praxis I was a new mandate,

most Kentucky colleges did not have an initiative in place aimed at Praxis I content mastery.

Definitions

In order to improve the readability of this project, it was necessary to identify pertinent terms. The following terms or reference groups appear throughout the body of the paper.

ACT: The ACT was formerly known as the American College Test; its title was shortened to the acronym in the 1990s. The ACT is a standardized test used as a readiness indicator of student success in college level courses. The test questions are multiple choice, and there are subtests in English, reading, science, and mathematics. The ACT literature states that if a student achieves a composite score of 21, then the likelihood of making a "C" or above in a college level course is probable (ACT, 2010).

Drill-and-skill approach: Drill-and-skill presentations focus on concepts and operations in a repetitive format to promote mastery of the targeted skill. Levin and Calcagno (2008) defined drill-and-skill courses as those "based upon the presentation of concepts, operations, or classification schemes and repetitive practice to master them" (p. 5). Levin and Calcagno stated that "the abstract and isolated nature" (p. 5) of drill-and-skill course presentations presents a barrier to student understanding because real-world application and usefulness are unclear.

Praxis I: The Praxis I exam is a group of content subtests offered through Educational Testing Services (ETS). The state of Kentucky requires subtests in reading, writing, and mathematics. As of 2011, 29 states recommended or required the Praxis I

subtests in reading, writing, and mathematics. The Praxis I subtests are nationally recognized standardized tests comparable to the ACT. The majority of test questions on the Praxis I are multiple choice. The writing subtest has an essay section (ETS, 2014).

Remedial/Developmental Programs: A remedial program was defined as "classes or activities intended to meet the needs of students who initially do not have the skills, experience, or orientation necessary to perform at a level that the institution or instructors recognize as 'regular' for those students" (Grubb, 1999, p. 174). Rubin (1991) defined remedial courses as "an organized system for delivering instruction, academic support, and personal development activities to students assessed as having potential for success if appropriate educational opportunities are provided" (p. 1). Calcagno and Long (2008) defined remedial and developmental courses as "coursework below college level offered at a post-secondary institution" (p. 1). Students take entrance exams, and if the scores note deficiencies, supplemental course work is recommended to address deficiencies and promote skill development (Calcagno & Long, 2008).

Teacher Education Department/Program (TED or TEP): Both refer to a teacher preparation program.

Significance

National and State Context

The significance of the problem of underprepared students was far-reaching and had no simple answer. Prior research showed that well-designed remedial programs yielded positive results (Bettinger & Long, 2009; Levin & Calcagno, 2008). Levin and Calcagno (2008) added that the lack of literature on the subject of remedial programs was

a hindrance when trying to choose a remedial program to implement, but did not make it impossible. Levin and Calcagno (2008) further contended that with innumerable programs and strategies available to choose from, the remedial program possibilities were boundless. In addition, Levin and Calcagno (2008) noted that combining one or more of the existing programs might result in the best combination for a given project. Surveying available remedial methods and reading prior research can assist in choosing which remedial program works best in a particular setting. No specific format existed for choosing a remedial program.

This study added to the sparse literature on remedial programs. As of 2011, limited information was available regarding how to design or choose a remedial program. There were no universal criteria to follow when deciding which remedial programs worked and why. There were risk factors and indicators to identify students who needed remediation, but these varied from college to college. This study contributed to future research.

As of September 1, 2012, Kentucky no longer accepted ACT scores for entrance into TEPs. The Praxis I exam, as the new requirement, proved to be difficult for many prospective teacher education students to pass. Therefore, the potential for positive social change was significant. Other Kentucky college personnel were interested in offering remedial programs geared toward education students, and the study was intended to promote these efforts.

Local Educational Context

The local TEP needed a remedial program to assist underprepared students desiring admission. State requirements were already difficult for many students, and the increase in the test score requirement compounded the problem. Many teacher candidates expressed a desire to work on skills that they lacked. Teachers assisted their students in skill development and understood their frustration level. It was imperative in the local TEP to find out if the remedial program worked for teacher candidates, and if not then some type of assistance would be recommended.

Guiding/Research Question

There are a significant number of underprepared students enrolled in U. S. colleges and universities (Anderson, 2004; Bettinger & Long, 2009; Stanley, 2010). Many students need some type of remedial course work to become successful in college. The local setting had a remedial course available, which used the drill-and-skill format. Administrators at the local setting needed to identify the best strategies for remediation of teacher candidates and determine whether the available remedial course could be improved or needed to be replaced. The local teacher education department administrators had not evaluated the existing program to determine whether the information tested on the Praxis I was covered. Alignment between Praxis I tested content and content of the current remedial program was crucial for effective remediation of TEP students. Prior to the study, the local teacher education administrators had not analyzed results of Praxis I scores of candidates who took the remedial course. This analysis was needed to determine whether remedial offerings at the local setting were helping students pass the Praxis I test.

The underprepared student population desiring admission into the TEP negatively affected the local university's TEP. The local program, existing in small setting, depends

upon enrolled students to operate. If students were unable to take education courses, the TEP impact was significant. Underprepared students needed remediation to pursue their academic and professional goals. The central question of the study was as follows: What is the current effectiveness of the existing remedial program in preparing teacher candidates to pass the Praxis I? To answer the central question, I used the following sub questions to guide the study.

Research Question 1: What is the current impact of remedial courses completion on participant admission to the TEP?

Research Question 2: What are the characteristics of the remedial courses?

Research Question 3: What evidence indicates that the courses are preparing teacher candidates to pass the Praxis I?

Research Question 4: What specific student needs are revealed by analysis of the data collected on the remedial course?

I conducted the study to answer the preceding questions to assist the local TEP in determining a course of action to improve remedial efforts.

Review of the Literature

Theoretical Framework

Historical overview. Constructivism is a theory in which the learner constructs new knowledge based on prior knowledge and develops cognitive activity (Wilson, 2010). According to constructivist theory, learning is an active process in which the learner makes connections in existing knowledge to build bridges to new material introduced (Wilson, 2010). Bruner (1960) received credit as the founder of constructivist

theory. Dewey's action-based research (1958) focused on learners and their environments. Bruner added to Dewey's research by detailing constructivist theory to include the learner's predisposition to learning. Bruner added that a learner was able to grasp information better depending on the way in which a teacher conveys knowledge. Bruner also noted that effective sequencing of material made learning easier and that rewards /punishments affected learning. Constructivist theory applied to both learning and the nature of knowledge.

In this study, I sought to determine whether learning and skill acquisition was occurring in the remedial courses at the local university. The remedial courses existed within the curriculum of the local university, but students who enrolled in the remedial courses often did not make social connections with other students due to the isolation of computer-based courses. Constructing meaning and learning from within a cohort group was crucial to the development of desired teacher behaviors (Faculty 2, personal communication, May 2013). While future teachers obviously need basic skills and content knowledge of their own, it was important for teacher candidates to receive instruction using the same strategies they apply in a classroom setting (Duncan, 2010).

Constructivist principles have connections to social learning theory. Both constructivism and social learning theory tie the student directly to the material presented and active practices of skill acquisition. Social learning theory, as defined by Bandura (1977), depicted learning as interactive and social. Bandura identified four levels of learning: attention, retention, reproduction, and motivation. In the first level, gaining new knowledge was followed by practice of the knowledge. Once new skills were processed,

they were stored in the retention level to use in knowledge acquisition. The reproduction level allowed for practice and continued improvement of a gained skill. Motivation involved an external reward or punishment. In addition to Bandura's social learning theory, a portion of Vygotsky's social constructivist theory promoted cognitive development. Vygotsky's (1978) social constructivist theory detailed the zone of proximal development (ZPD) as the point where a student can work independently or with little assistance to achieve mastery of a given task. In the more-knowledge-other (MKO) theory, Vygotsky proposed the idea that someone who knows how to teach a skill and can perform the skill assisted the learner in skill acquisition. Constructivism and social learning theory emphasized group learning and the social aspect of skill acquisition (Oxford, 1997). TEP students needed social skills and the ability to work well in groups.

Constructivism and social learning theory formed the framework for the study. Constructivism is a learning theory built on the assumption that new knowledge connects with prior knowledge (Hinshaw, Burden, & Shriner, 2012). Remedial courses promote basic skills attainment or refinement. If a student does not have the basic skill or the knowledge base to connect to, instruction is necessary. The most effective learning takes place when a learner interacts with the material (Fosnot, 1996). Active learning assists TEP students in achieving their goal and making them more effective educators. Dewey (1958) encouraged social change as led by educators for the greater good. Due to the intertwined nature of the educational elements of current learning, prior experiences, environment, and social context, constructivist theory is referenced in most educational research (Lambert, 2002).

Specific to the local problem addressed in the study, constructivism is the gaining of new knowledge by connections to existing knowledge. Most of the material on the Praxis I exam was not new to TEP students. Underprepared students needed skill acquisition to connect the material to real world practice if they hoped to apply it on the Praxis I exam. Underprepared students either missed key skill acquisition during prior education or needed skill refreshing due to disuse (Bahr, 2012). Presentation of the material in the Praxis I questions was not typical of questioning strategies used in prior education courses. Connecting what the students already knew to material and formatting for specific TEP knowledge assisted them in skill acquisition and application of the strategy to other situations. Construction of meaning and making connections between knowledge leads to an increase in retention for students (Wilson, 2010).

Literature Search Efforts

The national and state issue of underprepared students desiring to attend colleges and universities led me to review literature addressing remedial programs designed to help underprepared students have success in postsecondary education. The local problem I faced was unsuccessful admission to the TEP due to insufficient scores on national norm tests. My review of related literature defined remediation, summarized historical information, and pointed out relevant details regarding the remedial landscape in higher education.

I searched the ERIC database, Education Research Complete, Education from Sage, Academic Search Complete, Kentucky Virtual Library (KYVL) archives and databases, Google Scholar, and Dissertations and Theses at Walden University. I found

articles by using the terms *developmental education*, *remedial education*, *successful remediation, remedial courses, findings on remediation, types of remediation, underprepared college students, skill deficits in college, TEPs, Praxis test series for teachers,* and *college remediation*. I used several terms in conjunction with one another and different combinations of the words. Many of the articles had helpful resource lists that led me to background articles that assisted me in finding beneficial sources. The local university supplied books for the theoretical framework. The librarian obtained articles and journals in hard copy from the library collection or from interlibrary loan sources. All of my sources were brick and mortar obtained and did not rely upon computer sources. The books by Dewey are in my personal book collection.

Definition of Remediation

Remedial programs have a long history throughout U.S. education. According to Grubb (1999), *remediation* referred to "a class or activity intended to meet the needs of students who initially do not have the skills, experience, or orientation necessary to perform at a level that the institution or instructors recognize as 'regular' for those students" (p. 174). Experts in the remedial field use the terms *remedial education* and *developmental education* interchangeably (Deli-Amen & Rosenbaum, 2002). Rubin (1991) defined *developmental education* as "an organized system for delivering instruction, academic support, and personal development activities to students assessed as having potential for success if appropriate educational opportunities are provided" (p. 1). Bonham and Bliss (1994) described developmental education programs as involving a range of services directed toward the cognitive and social growth of students. The overall

intent of remedial or developmental education programs was to raise the probability that high-risk students would succeed at college level work (Kulik & Kulik, 1991). Though many use the terms *remedial* and *developmental* interchangeably, Shaw (1997) distinguished a slight difference: "Developmental education provides skills that students were not previously taught, and remedial education re-teaches skills that students were exposed to, but did not learn" (p. 287). Underprepared students likely need both types of instruction, so for the purpose of this study I used the terms interchangeably.

Remedial programs assist students in meeting existing academic standards by offering services that may include assessment, instruction, tutoring, advising, and counseling. Remedial programs typically provide reading, writing, and mathematics instruction. Tutoring, advising, and counseling programs exist to immerse students in the learning community so they can participate more fully in the college learning experience (Casazza, 1999; O'Hear & MacDonald, 1995). Remedial courses are an attempt to bridge the learning gap between underprepared and regular students beginning college.

Historical Perspective

The need for remedial programs in the college setting has been well documented (Wyatt, 1992). The origin of remediation dates back to the 17th century when Harvard University administrators assigned underprepared students to work with tutors to meet academic standards (Bettinger & Long, 2004). The first formal preparatory programs with remedial purposes in basic skills began in 1849 at the University of Wisconsin (Breneman & Haarlow, 1998). At the beginning of the 20th century, large numbers of underprepared students were seeking a college education. Half of the students enrolled at

Harvard, Princeton, Yale, and Columbia were required to enroll in remedial courses (Merisotis & Phipps, 2000). College administrators concluded that the increase was a result of middle class Americans seeking to better themselves with a college degree (Merisotis & Phipps, 2000). World War II veterans taking advantage of the G.I. Bill contributed to the need for remedial education in the 1950s. The veterans had not been prepared for college by their previous educational experiences. The passage of the Civil Rights Act of 1964 and the Higher Education Act of 1965 also increased the numbers of underprepared students seeking higher education. Both pieces of legislation led to the addition of students previously excluded from higher education, specifically minorities and women (Payne & Lyman, 1998), which resulted in a more pronounced need for remedial courses (Payne & Lyman, 1998). In addition, the implementation of open admissions policies granting admission to low-income students resulted in an increase in the need for remedial programs (Merisotis & Phipps, 2000). Open admissions policies allowed students to enroll regardless of qualifications. Since the advent of open admissions, remedial course have become more common (Shaw, 1997).

Remedial programs have expanded over the years as enrollment in college has included a more diverse population (Plucker, Wongsarnpigoon, & Houser, 2006). Cross (1976) identified the target audience of remedial education as students who score in the lowest third among national samples on standardized aptitude tests. In the early 1970s remedial courses in college were designed as refresher courses for adults returning to school whose skills had diminished over time (Asera, 2006). The assumption was that adult students returning to an educational setting needed a refresher course before

embarking on degree pursuits. With an increase in underprepared high school graduates, displaced workers, and other adults enrolling in college, remedial education was likely to continue to increase (Calcagno & Long, 2008).

Avoiding remediation was not feasible, so consideration of alternative remedial efforts may be more beneficial than the traditional programs (Attewell, Lavin, Domina & Levey, 2006; Parker et al., 2010; Parker et al., 2010) Most colleges and universities offer remedial courses. In 2000, 80% of public 4-year colleges and 98% of 2-year colleges offered remediation (NCES, 2003).Though remediation was offered at most post-secondary institutions it had a controversial position with die-hard supporters and strong armed opposition (Boylan, 1999).

Supporters of remedial education proposed that the information on remedial programs should characterize it as beneficial to the participant (Boylan & Saxon, 2005; McCabe, 2003). Remedial courses offered underprepared students the opportunity to improve their basic skills and gain admission to their chosen degree programs (Parker et al. 2010). Rather than allowing students to enroll in a course and fail, administrators offered remedial placement to reduce attrition (Parker et al. 2010; Tinto, 1998).

Remedial Placement

According to Bettinger and Long (2004), "Colleges differ significantly in how they place students into the courses and the requirements to govern their completion" (p. 8). According to Bettinger and Long (2004), the majority of colleges and universities mandated some type of skills assessment, but the skills assessments were widely varied. Most states required mandatory placement testing for reading, writing, and mathematics,

but no two institutions had the same set of standards to judge pass or failure (Perin, 2006). With no set standards for remedial completion or placement in remedial courses, it was impossible to determine whether remediation was successful. In other words, if no two remedial programs were the same, and qualifiers for remediation were not consistent, one could not know whether the remediation completed was appropriate for a particular student (Parker et al. 2010).

Resistance to Remediation

Due to diversity in students' ability, socioeconomic status, age, educational background, and other factors, some education professionals did not support remedial programs and others actively opposed them. Opponents argued that because of the diverse student population, one single remedial effort would not work for all students (Bailey, 2009). In order to serve the diverse population of underprepared students more effectively, educators needed to employ innovative and nonconventional remedial programs (Bailey, 2009).

Remediation: An overview. Research on the long-term effects of remediation was largely unavailable because follow-up performance of participants in remediation programs was difficult to measure, and some students dropped out, transferred, or failed to complete remedial courses (Wang et al, 2010). Parents and students did not support remedial courses because they increased the time and money involved in obtaining a college degree (Boylan, Bonham, & Rodriquez, 2000). In addition, opponents of remedial courses argued that a stigma might result from placement in a remedial program (Bailey, 2009; Bettinger & Long, 2004). Bettinger and Long (2004) found that placing students in

groups of lower-ability students had a negative impact on achievement, especially with borderline students who barely qualified for remediation. Students whose peers were higher achievers pushed themselves to improve. Bettinger and Long (2004) proposed that students with only one area of need benefitted from being integrated with other students with the same basic skill need.

Remedial methods. Perhaps the key piece to the remedial puzzle was the teaching strategies used to instruct students in remedial programs. The drill-and-skill method was widely used but not seen as successful (Bailey, 2009). Typically, most high schools employed the drill-and-skill method, which likely resulted in the need for remedial programs in the first place (Bailey, 2009). Because underprepared students did not learn the skills when taught with the drill-and-skill approach, using of the same approach in a remedial course was not going to be effective (Levin & Calcagno, 2008).

Remedial controversy. The controversy surrounding remedial education and acceptable strategies to use in remedial programs has promoted a recent surge of research on the effectiveness of remedial programs in colleges. Some early studies on the outcomes of remedial programs addressed skill improvement and persistence to degree completion (Boylan et al. 2000). Boylan and Saxon (1998) examined completion rates and found that 70% of students taking remedial courses finished them and proceeded to the next semester in a regular education course.

The purpose of a remedial course remains to prepare the student to matriculate into regular general education courses. Boylan, Bonham, and Bliss (1994) studied students' success in general education courses after finishing a remedial English course.

They found that approximately 90% of the students who passed the remedial English course with a "C" or above went on to pass the first college English course (Boylan et al., 1994). The remedial mathematics course was less successful with approximately 70% going on to pass college Algebra (Boylan et al., 1994). The study findings allowed researchers to conclude that completing remedial courses in a skill-based discipline resulted in success in college level courses in the same discipline. Bahr (2012) noted that underprepared students improve their basic skills, but may not improve enough to do well in college level courses. Lingwell (2010) stated that writing skills have declined steadily since the 1970s. Wang (2009) found that while remedial course completion assisted students in a 2-year institution, students rarely make the transition to a 4-year institution without needing additional remediation.

Due to the wide scope of remedial education, definitive information was sparse (Bailey, Jeong & Cho, 2008). Because of the varied factors that contribute to learning and learning struggles, there was "little rigorous evidence on the effectiveness of college remediation on the outcomes of students" although it was related to persistence from Year 1 to 2 of college (Calcagno & Long, 2008, p. i). Because so few studies were available and communication between programs and universities was limited, examples of innovative or successful remedial practices were not readily accessible or easily replicable. The prospect of reforming remedial programs is a daunting task (Parker et al., 2010; Stanley, 2010).

It was difficult to determine if a remedial program was successful because of inconsistencies among colleges regarding score requirements in remedial courses. There

was no consensus among educators on how to carry out remedial education effectively (Bailey, 2009). Without a general list of accepted requirements, it was difficult to determine if a plan was effective (Stanley, 2010).

Colleges and universities need to be experimenting institutions and seek better and more innovative strategies to improve remedial results (Levin & Calcagno, 2008). Higher learning institution administration needs to adjust existing programs based on research findings (Bailey et al., 2008; Levin & Calcagno, 2008). This study's purpose was to determine whether underprepared teacher education students at a local university were acquiring skills and content knowledge needed to pass required basic skills tests.

Teacher Education Remediation

If teacher education students were better prepared, then future teachers would be better prepared as a result. Kentucky educational leaders' current push to reform teacher education policies in order to build teacher effectiveness may result in lessening the need for remedial programs for teachers in the future (Duncan, 2010). The purpose of educational reform was to lessen the need for remedial efforts for the future (Berry et al., 2010). The students attempting admission into a TEP were underprepared in basic skills and needed remediation centered on developing the desired teacher skills that evolved from the content material (Berry, et. al 2010).

Remedial programs targeting teacher education students were on the education horizon. Better preparing teachers would result in better student performance (Wang et al., 2010). Policies existed to constitute teacher aptitude, but little assistance existed for students who want to be teachers, yet lack competencies for admissions into a TEP.

Implications

The local study yields information regarding the existing remedial program's validity for education students. Comparing the actual content and skills taught to the actual content and skills tested yields data to determine if the remedial courses are addressing appropriate areas for students acquiring Praxis I skills. Determining whether content taught and content tested matched assists in either revamping the existing course or creating a more suitable alternative. Results yielded information on the instructional practices used in the remedial program, course content, and possible connections between the course curriculum and the tested information on the Praxis I. Research stated that innovative practices assist students more effectively in skills acquisition (Bailey et al., 2008). A comparison between course content and Praxis I skill sets may determine if an effective connection exists. Constructivist teaching practices promote the acquisition of new knowledge based on knowledge already attained (Dewey, 1958).

Student practice Praxis I test scores received needed analysis. Additionally, through the analysis of existing data, suggestions for improving instructional or evaluation strategies emerged. A better understanding of the needed support will provide opportunities to improve and accelerate student success and retention. Information regarding student demographics, though limited, provided insight into designing a remedial effort that specifically assisted identified sub-groups.

The study project is a white paper advocating the development of an alternative course to the current remedial course, one designed specifically for the Praxis questions that may or may not simulate standardized testing procedures. Discovery of instructional

practices benefits teacher education students. Which will lead to development of additional programs or courses. The analysis of the results supports designing a specialized remedial course for teacher candidates.

Summary

Underprepared students were attending college (Bailey, 2009; Deli-Amen & Rosenbaum, 2002; Tritelli, 2003; Rose, 2010). Standardized test scores measuring basic skills were consistently lower than desirable on national, state, and local levels (ACT, 2009). The state of Kentucky implemented new requirements for admission into TEPs. The local setting was attempting to assist students in need of remediation to be qualified for teacher education admission. The local TEP was endeavoring to better prepare teacher candidates. A remedial program was one way that colleges were trying to assist underprepared students (Deli-Amen & Rosenbaum, 2002; Parker et al., 2010). Of central importance on the local level, the TEP was especially in need of developing a successful remedial program for TEP students. The following sections of this study provided information regarding the local evidence of the problem and supporting details. Section 2 provided the methodology relating to the development of the study. Section 3 provided the details of the study and the findings from the project study. Section 4 contains reflections and conclusions discovered based on the project study findings.

Section 2: The Methodology

Introduction

Variations existed in remedial programs, and much of the research available was inconclusive regarding the outcomes for college students (Bettinger & Long, 2004). The effects of many remedial programs were unclear because the tracking of the students did not occur after the initial remedial course (Bettinger & Long, 2004; Levin & Calcagno, 2008; Parker et al., 2010). Some students had shown improvement from initial skill levels, but these did not increase enough to help them continue in college (Parker et al., 2010) or they did not continue remediation or support during college. Drill-and-skill programs were the most prevalent (Bailey, 2009). In this study, I sought to determine whether the existing remedial program was effective for teacher candidates seeking to reach minimum required scores on the Praxis I preprofessional skills exam.

The central research question was the following: What is the current effectiveness of the existing remedial program in preparing teacher candidates to pass the Praxis I? The continuation of the TEP at a local university depended on the results of the study. Underprepared students who needed assistance to gain admission negatively affected the teacher education department in a variety of ways including possible elimination of the program, student frustration, increased costs for students, low enrollment, and decreased need for faculty. I conducted a case study to investigate the current remedial course content and its connection to Praxis I tested skills. I sought to determine whether the current remedial program was effective in preparing teacher education students for the Praxis I, or whether a suitable remedial alternative existed.

Research Design and Approach

In order to answer the guiding questions, I followed the case study research model and collected unevaluated, archived data from the teacher education department. By gathering and evaluating these de-identified data, I created a clear description of the local problem related to underprepared students seeking admission to the teacher education department. Gathering and analyzing de-identified student demographic data, test scores, and any other available documents related to these students' preparation for passing the Praxis I provided rich descriptions and insight regarding an appropriate improvement plan.

Qualitative methods are holistic in nature, and qualitative researchers explore relationships within a specific context (Janesick, 2004). Quantitative methods primarily work with numerical data (Vogt, 2007). According to Vogt (2007), most studies have aspects that relate to both research methods; in this particular study I used qualitative methods in a case study design. Although I gathered some numerical data during the analyses, the intent was not to test for statistical significance but rather to construct a rich description of the factors and resources associated with this local problem. The statistical data from practice tests and remedial course completion grades helped me to identify similarities and differences that existed. This study required a qualitative approach because I sought to understand a specific problem at a particular location.

I chose a case study design because it met the criteria set forth by Creswell (2014): The study was restricted to a particular location, a local university; the study involved a select group of participants, the underprepared students seeking entrance to

the TEP; and the problem was currently taking place. The nature of the data collection was holistic and tied to a specific context, thereby warranting a case study design (Janesick, 2004) including descriptive statistical data and document analysis.

Qualitative Method Justification

Qualitative researchers in an educational setting focus on educational issues with the goal of improving existing educational practices (Hatch, 2002). In this study, I focused on how to improve content knowledge and skill acquisition for underprepared teacher education students. In qualitative research, analysis is continual throughout the process because the search for meaning in the data directs the continuation of the study (Hatch, 2002).

Following Vogt's (2007) recommendation, I analyzed quantitative data such as descriptive statistics to identify patterns, findings, or facts in the course content. Test scores and previous performance in remedial courses did not reveal significant descriptive differences in performance or achievement among students. The lack of a pattern regarding students' characteristics indicated that the participant sample was not large enough to yield significant sub-group identifications to assist the local setting.

Quantitative researchers work primarily with numerical data (Neuman, 1994), and I did not follow this approach in this study. A comparison of course content with Praxis I test content yielded information that assisted my qualitative inquiry. The analysis of Praxis I or course achievement scores was descriptive rather than inferential. The intent was not to determine statistical significance, but rather to determine appropriate educational changes to promote the desired outcome for the local setting. I collected data

related to local teacher candidates who were not meeting minimal state Praxis score requirements. The study generated nominal measures to categorize the data collected. Nominal measures were categories assigned to label data collected for comparison (Vogt, 2007). Categories assigned to components of tested material and remedial instructed material yielded data for comparison that provided rich descriptions of this local problem. I analyzed numerical descriptors and remained focused appropriately. Because I did not have the dual focus of providing qualitative and quantitative perspectives to bolster the findings, a mixed-methods design was not appropriate (Creswell, 2014). Inadequate Praxis I scores indicated student deficiencies in reading, mathematics, and/or language arts content areas, but the connection of the remedial course to underprepared TEP students was unknown prior to the study. I did extensive document analysis and coded course texts and syllabi for Praxis I content analysis. I also looked at relevant records regarding remedial courses students took. Because the purpose of this coding process was to help me compare information rather than determine statistical impact, the best way to address this problem was with a case study design. According to Hatch (2002), most research includes both qualitative and quantitative data. The analysis of multiple forms of data in a case study was, therefore, appropriate.

Qualitative Models and Justification

Qualitative research designs involve holistic data collection, and the researcher is the primary instrument (Janesick, 2004). Qualitative researchers consider the social context and the relationship that exists between the problem and the subjects (Creswell, 2014). Dewey (1958) pointed out that qualitative research involves artistic elements

because the researcher must describe and explain all parts of the study, including the setting, participants, and data collection. I conducted data analysis systematically and continually throughout the course of the study to search for meaning behind a particular occurrence (Hatcher, 2002). Qualitative researchers in an educational setting focus on educational issues or problems to improve an existing educational practice (Hatch, 2002). Qualitative researchers have many different models with similar aspects, and a researcher must choose the best option for the specific problem (Hatch, 2002).

Using the artifact analysis model, I looked at how inanimate objects relate to a problem/area of study (Hatch, 2002). I used qualitative document analysis (QDA) with the purpose of "integrat[ing] method, procedure, and technique for locating, identifying, retrieving, and analyzing documents for their relevance, significance, and meaning" (Hesse-Biber & Leavy, 2008, p. 128). QDA was an appropriate choice for gathering data regarding the Praxis success rate at this local school.

I looked at test items, texts, syllabi, and test scores of students. I compared tested content and remedial instructed content to determine similarities and differences. In this context, *content* was a descriptor of the elements present within the tests regardless of whether they were declarative or directive narrative or discussions of the necessary skills for successful teaching. Analysis of content from Praxis I coded tests to remedial course content and objectives yielded a certain amount of data. Examining test scores indicated areas where students needed assistance. The artifact or document analysis of the texts and content of the remedial courses focused on comparison of taught to tested content.

Other qualitative models. According to Creswell (1998), there were four distinct qualitative study designs: biography, phenomenology, ethnography, and case study. Hatch (2002) proposed that there were limitless data collection methods but specifically identified participant observation, interview, artifact analysis, naturalistic observation, and action research as viable options. The basis for selection of a given study relies on the appropriateness of the model's criteria.

Biographical model. The biographical model involves a single person and the way events related to that person (Creswell, 2014). My study dealt with a specific group of people and their success or failure when receiving remedial intervention. Therefore, the biographical model was not appropriate for my study.

Phenomenological model. The phenomenological model involves a single phenomenon and philosophical aspects of the phenomenon (Creswell, 1998). Hatch (2002) added that phenomenology should preclude preconceived notions. This local problem shared some aspects of a phenomenon in that underprepared students in TEP were not the norm until implementation of new requirements in 2012; however, the lack of philosophical aspects eliminated this model as a viable choice. Instead, I sought to determine whether available remediation assisted underprepared students.

Ethnographic model. The ethnographic model, which had its foundation in anthropological research, primarily involves examination of individuals and cultures using scientific social descriptors to explain the connections between context and its effect on the culture or individual (Hatch, 2002). I did not seek to measure the impact of a problem on culture or society using scientific descriptors. Instead, I sought to determine

which factors contributed to the local problem of underpreparedness for the TEP. Therefore, the ethnographical model was not an appropriate option.

Participant observations, interviews, and naturalistic models. Other research tools included participant observations, interviews, and naturalistic studies (Creswell, 2014; Hatch, 2002). Due to ethical limitations, participant observations and interviews were not components of the study. All teacher education students were my students; therefore, interview information could affect student contributions or the findings. Having knowledge of the students and their habits could taint the evidence collected. The interview model required interviews to be the central data collection element (Hatch, 2002), and ethical constraints prevented me from gathering data from my own students. A naturalistic study was not appropriate because the natural setting was not a predominant factor that influenced the findings. While some of the data related to the natural setting, it was not central to the study's purpose. The study was a practical attempt to offer possible solutions to a local setting. Underprepared teacher education students needed remediation to pass state required tests. Evaluation of existing data was necessary to create an accurate portrait of this local problem and the factors and resources related to addressing this local problem.

Case study model. The case study model was the best choice for this study. The case study model fit the parameters of the study because of the setting, participants, and the time-period requirements (Creswell, 2014). The nature of the data collection was holistic and tied to a specific context, therefore lending itself to the use of the case study model (Janesick, 2004).

Data Collection and Analysis

To determine the status of the TEP's existing remedial program, I gathered and examined archived documents or data for information regarding previous or present participation in or components of the current remedial program. I identified the students who took remedial courses, where they took the courses, and the grades they received in the courses to construct a narrative of the current students' remedial histories. I compared the Praxis I tested material with the existing curriculum for the remedial course. By gathering and evaluating these de-identified data, I created a clear description of the local problem related to underprepared students seeking admission to the TEP. Gathering and analyzing de-identified student demographic data, test scores, and any other available documents related to these students' preparation for passing the Praxis I provided rich descriptions and insight regarding an appropriate improvement plan.

Setting and Participants

The university was a small, Christian university set in a predominately rural area in Kentucky. Students from four states lived within reasonable commuting distance from the university. The student body was composed of approximately 300 traditional students and 3,000 adult students. The university had a diverse student body with many international students. Ninety percent of traditional students were also student athletes. Of the 300 traditional students, approximately 60 desired admission to the teacher preparation program; 41 of these were ineligible due to inadequate Praxis I scores. Collection of data regarding demographics such as, race, ethnicity, sex, age, and international status did not yield significant results regarding underprepared students

seeking admission to the TEP. Due to the small setting and participant pool, I was not able to identify discernible demographic patterns, though some observations were relevant in the findings.

Procedures for Access and Ethical Issues

All student and university data used in this study were de-identified and anonymous. To protect the teacher-student relationship, student identities required anonymity. Knowing student identities could have led to skewed findings and would have been unethical. I did not contact teacher education candidates during the data collection phase of this study. I used archived data. The local university provided an IRB agreement upon approval from the IRB at Walden University.

There was no researcher-participant relationship developed during the data collection phase of this study. Because the student information was de-identified, no other measures were necessary to protect the participants. All data collection, analysis and results were free from student identifiers and were used by the teacher education department for the sole purpose of assisting current and future candidates in achieving minimum required scores on Praxis I subtests. All teacher education students were required to take the Praxis I practice test during the Introduction to Education course.

The study findings provided a starting point for future endeavors to assist underprepared students in the local setting. Identification of deficits from individual student test performance would be ideal in designing a new remedial course, or for modifying an existing course. It would be impractical to design a tailor made course for each individual student. Identification of skills needed and a comparison to skills

instructed led to a need to change the remedial program. The option to design a remedial course for teacher education students emerged. An obvious suggestion for the future would utilize individual student test performance once this base line study is completed.

Participant Selection Criteria and Justification

There were no true participants in this study because I collected and analyzed archived data that were de-identified. No contact took place between the researcher and participants. All data collection involved the transfer of archived data from the teacher education department, registrar, and admissions offices.

Justification for number of participants. There were no participants in this study. All data related to the local school, its remedial programs, and status on Praxis I exams were examined with the sole purpose to benefit the local community and attend to the problem defined in this study. The local TEP was small, so the number of available scores was limited. Students were required to take the Praxis I practice test, so every TEP student had results available. Practice test scores were available beginning with the Fall of 2012. Student test scores, practice test scores, and remedial course participation were included in student records beginning Fall 2009 to the cut-off semester of Fall 2013. Through the study, I analyzed the data from 41 students that were ineligible for TEP entry due to low test scores.

Data Collection

Data compilation occurred from the appropriate local school departments and archives per a signed IRB from the local university, after the Walden IRB (04-21-14-0049995) had approved the methodology of this study. I collected the following archived

data sets: student scores on Praxis I exams (practice and actual); remedial course data including grades assessed location, course syllabi, and textbooks; Praxis I test question analysis on the practice exam questions, provided from ETS; Praxis I test question analysis created by the researcher.

I retrieved most data from the TEP files. The TEP administrator retrieved data from the Registrar in order to preserve the de-identification of the data set. The university Registrar provided official scores and remedial course data, including location. The Registrar provided grades assessed on non-credit remedial courses. The TEP database did not have information on non-credit courses. All data required analysis. The aggregation and analyses of these artifacts and documents provided a compelling picture of the situation. The following section explains in detail the data collection phase of the study.

Student Demographics

The TEP database spreadsheet contained information for student demographics. The database contained information on sex, ethnicity, date of birth (age), ACT composite score, Praxis I scores (subtests of math, reading, writing), athletic status, age, international status, and non-credit hours (remedial courses included). I created a table to compare student demographic data to look for any discernable trends. I assigned each student a blind identification number 1-41 for analysis.

Praxis Data

General Praxis I information. According to the ETS website, the Praxis I is a measurement of the basic skills in reading, writing, and mathematics. The tests determined if a candidate's academic skills were adequate to prepare for a career in

education. Many colleges and universities used the test results to determine student eligibility for entry into education courses. Praxis I testing formats had two options: either paper or computer formats. International networks of test centers administer the Praxis I exams. Computer tests had year round administration by appointments on specific dates. Pre-scheduling was available for paper tests throughout the school year on specific test dates. The administration of the test was presided over by a proctor and directives read orally to participants. The oral directions were similar to those given at any proctor officiated test (Faculty 1, personal communication March 2013). ETS develop and administer all Praxis assessments. The Praxis I skills test was set to measure college skills and national norms were determined through the combined test scores of college freshmen, sophomores, and junior level students taking the test. ETS provided a basic skill identified for each practice test question. The Praxis I exams required are PPST (Pre-Professional Skills Tests) subtests of reading, writing, and mathematics. Each test was individual and could be taken together or one at a time. There were no composite or combined scores on the Praxis I tests. Praxis I exams were scaled exams. The score range for the reading, writing, and mathematics tests was 150-190. The minimal passing scores for Kentucky were 172 in reading, 172 in writing, and 173 in mathematics.

I gathered three distinct types of Praxis data to provide a rich picture of the situation at this local school: student scores on practice Praxis I exams, actual Praxis I scores from ETS exams, and Praxis I practice test question analysis that I created. I provided below, the process I used to retrieve and organize these data during the collection phase. Collecting the data regarding student test scores, both actual and

practice, took little research time. The documentation was readily available in raw form and only needed transcription onto some type of spreadsheet for easier readability.

Praxis I: Actual exams. Praxis I actual scores were recorded on the official student record on the TEP database. The TEP administrative assistant provided a database spreadsheet, with student names omitted, that recorded the actual test scores. The ETS official score sheet does not provide detailed question analysis, and questions from the actual test are not revealed. I recorded scores on spreadsheets I created to aid in comparison for the analysis. I assigned numbers 1-15 to students with actual test scores. I collected the actual Praxis I scores on all three subtests on 15 students. The range of each test was 150-190 points.

Praxis I: Practice exams. Because the Praxis I exam was costly, the TEP of the local setting administers practice Praxis I exams to determine if a student should proceed with taking the actual exam. In this way, the TEP assesses student readiness prior to taking the actual exam. The TEP database did not officially record practice Praxis I exam scores, although the practice scores remain filed and secured in a TEP binder. For this study, 26 students' practice Praxis I scaled scores for all three subtests, each ranging from the possible test scores of 150-190, received analysis. Each practice test score received a randomly assigned number from 16-41. Identification of the individual answer sheets for each student was not included.

In addition to the scaled scores for 26 students, I collected student completed answer sheets for all three practice sub-tests, with student names removed by the administrative assistant. When the data set was completed, I included practice reading

scores from 37 students, practice mathematics scores from 34 students, and practice writing scores from 32 students.

Praxis I: Practice exam question analysis. The practice Praxis I exams provided a basis for test question analysis. I collected the practice Praxis I exams from the administrative assistant from TEP files on the database. The department chair purchased practice exams from ETS in an e-book format. TEP purchased the use of the program to administer practice tests to students. ETS provided reading categories of Literal Comprehension and Critical and Inferential Comprehension. ETS provided writing categories of Grammatical Relationships, Structured Relationships, and Idiom and Word Choice, Mechanics, Correct Usage. ETS provided mathematics categories of Numerical Knowledge, Understanding Algebra, Geometric Relations, and Math Application. Using the broad categories provided by ETS, I created sub-categories to better pinpoint student problem areas. I used textbooks from the remedial courses to help identify the skill/knowledge needed to answer the question correctly.

Remedial Course Data

I gathered three distinct types of remedial course data to provide a rich picture of the situation at this local school: student remedial course history, remedial course syllabi, and remedial textbooks. I provided the process I used to retrieve and organize these data during the collection phase.

Remedial course history. The TEP database provided limited information about remedial course history. The database only recorded number of non-credit hours. Non-credit hours can be remedial courses, athletic participation courses, or courses not

accepted by the university. In order to find out remedial course details, I had to consult the registrar for official student transcript information. From the TEP database information de-identified by the administrative assistant, I compiled a list of students who had taken non-credit courses. Using the students assigned number from my spreadsheet, I gave the administrative assistant a list of students who had taken non-credit courses and requested the transcript information detailing the non-credit courses. The registrar provided the administrative assistant with the transcript information, the administrative assistant removed the student names, and the student's corresponding number assigned in the place to identify students for study purposes. The transcript information provided the non-credit course name, grade, and location.

Remedial course syllabi. Each semester, the university registrar collects a copy of each course syllabi taught in that semester. The university registrar provided copies of the remedial course syllabi to the TEP administrative assistant. I received the electronic copies through university email. I retrieved the remedial course syllabi for the four remedial courses: Writing Improvement; Grammar/English; Math Improvement; General Mathematics. Each syllabus provided a course catalogue description, textbook list, course objectives, and a day-to-day schedule of textbook chapters.

Remedial course textbooks. The course syllabi included textbook names and ISBN numbers. The university library ordered remedial course textbooks for my use in the study. I used these copies to detail the content covered in each chapter and to analyze the correspondence to information tested on the Praxis I practice exam. I had to use the practice exam questions; actual test questions were not available to scrutiny.

Data Recording and Tracking

Praxis I data and demographics. I recorded data on tables created in Microsoft Word (Version 2013) [Computer software]. Actual and practice Praxis I test scores were available for 41 students. Assignment of blind numbers identified students, 1-15 for students with actual tests, and 16-41 for students with practice tests. In order to tabulate student demographics, I created a table, for my use, using the same number designation for the student, which detailed items such as gender, age, first time college student, returning student, athlete and which sport, nationality, ethnic background, and international status. The TEP database information from the AA, provided all student demographic information and all Praxis I scores. I completed the organization of the raw data. All hardcopies of data were stored in binders and computer files.

Additional Remedial Course Data

Organization of student remedial history took place once the registrar provided course transcript information. Not all 41 students took remedial courses, so the information was organized into a separate table, student assigned numbers were used to identify which students took remedial courses.

Evaluation of the remedial course syllabi and textbooks for content took place. The library provided the textbooks for my use. The registrar provided the course syllabi.

Data Analysis

The purpose of this study was to determine if the current remedial program at a Kentucky university was effective in preparing teacher candidates to pass the Praxis I exam. The central question led to four sub-questions in order to determine the answer.

Collection and data analysis took place concurrently. I conducted a thorough QDA, that had "an emphasis on discovery and description, including searching for contexts, underlying meanings, patterns and processes, rather than on mere quantity or numerical relationships between two or more variables" (Hesse-Biber & Leavy, 2008, p. 128). Discussion of these data takes place in the following subsections.

Demographics

Demographic data was part of the data gathered from the TEP database by the AA. In the data set collected for this study, Praxis I scores were provided from the TEP for 41 students (n = 41, 10 males and 31 females). The age demographic was 32 traditional age (18-25 years of age) and 9 adult (25 years of age and older) students. The ethnicity make-up was 28 white non-Hispanic, 8 black, 3 Hispanic, and two other. Three international students were included, one from Kenya, one from Trinidad, and one from Puerto Rico. There were 19 transfer students, and 22 students who began at the local university. The demographics sample was limited due to the size of the university and make-up of the student body. The demographics showed that most of the students involved were white females of traditional college age. Analysis of the demographic data did not have conclusive evidence of any group of students more in need.

Background of Praxis I Results

Collection of the Praxis I scores data set took place after IRB approval as per the Data Use Agreement. I collected, organized, and analyzed student Praxis I subtest scores in order to address the research questions. The local school's administrative assistant retrieved all Praxis I subtest scores from the TEP database, including the subtest scores

for reading, writing, and mathematics for each individual that took an actual or practice Praxis I test. Possible scores for each Praxis I subtest range from a low of 150 to a high of 190. The minimum state required scores for passing the Praxis I subtests in reading, writing, and mathematics were 172, 172, and 173, respectively. Using these criteria, my first step was to determine passing and non-passing scores from the data set for use in the study. If a student did not achieve minimum required scores on any subtest, the scores were included. The only scores used for the study were those below the state required scores for each individual Praxis I test. I included scores for students who did not achieve passing scores on any of the three subtests. A limited number of students passed one or two of the subtests. There were 41 data sets culled from the 70 retrieved from the TEP database. Of these 41, 15 were data sets from students that took the actual Praxis I exam and the remaining 26 were from students who took a practice Praxis I exam. Because practice Praxis I exams were retired actual Praxis I exams that were administered in previous years, it was appropriate to include both data sets in this analysis. Referral of the data groups of Praxis I scores within this study, were *actual Praxis I scores* and *practice Praxis I scores*.

Actual Praxis I scores. I organized the 15 actual Praxis I scores into tabular form and randomly assigned each student data set a number 1-15. Of the 15 students, 11 students passed at least one of the three subtests. Only two students passed two of the subtests. These data indicated that of these 15 students, there were four that experienced no success at passing the Praxis I ($n = 4$), nine that passed only one of the three subtests ($n = 9$), and two that passed two subtests ($n = 2$).

When analyzing the dataset by subtest rather than student, 5 of the 15 students passed the reading subtest, three passed the writing subtest, and five passed the mathematics subtest. These data indicated 13 passing subtest scores for the 11 students that experienced some success of achieving the Praxis I subtest content. Of the two students that passed two subtests, both passed the mathematics subtest. The student scores for the reading subtest ranged from 164 to 178 with 5 scoring 172 or higher, the student scores for the writing subtest ranged from 160 to 175 with three scoring 172 or higher, and the student scores for the mathematics subtest ranged from 162 to 182, with five scoring 173 or higher. Table 1 provides the data for the actual Praxis I scores retrieved for Students 1-15.

Table 1

Actual Praxis I Scores of Students by Subtest (n = 15, 150 ≤ x ≤ 190)

	Subtest Scores		
Student	Reading	Writing	Mathematics
1	169	168	164
2	164	172*	176*
3	170	169	170
4	165	165	177*
5	171	167	173*
6	164	175*	166
7	169	171	172
8	173*	169	167
9	172*	168	166
10	173*	169	182*
11	173*	166	168
12	164	166	174*
13	168	172*	169
14	166	168	162
15	178*	160	166

*Denotes passing score on respective subtest

Table 1 recorded the actual Praxis I subtest scores logged before the TEP's protocol of offering a Praxis I practice test.

Practice Praxis I scores. In order to help students prepare for the Praxis I exam before paying the expensive fee for the exam, the TEP at the local school began offering a practice Praxis I exam for each subtest. From the TEP's database of Praxis I scores retrieved for this study.

I organized the 26 practice Praxis I scores into tabular form and randomly assigned each student data set a number 26-41. Of the 26 students, one student passed at least one of the three subtests. Only four students passed two of the subtests. These data indicated that of these 26 students, there were fourteen that experienced no success at passing the Praxis I (n = 14), eight that passed only one of the three subtests (n = 8), and four that passed two subtests (n = 4).

When analyzing the dataset by subtest rather than student, 4 of the 26 students passed the reading subtest, five passed the writing subtest, and seven passed the mathematics subtest. These data indicated 16 passing subtest scores for the 12 students that experienced some success of achieving the Praxis I content. The student scores for the reading subtest ranged from 153 to 181 with four scoring 172 or higher, the student scores for the writing subtest ranged from 150 to 176 with five scoring 172 or higher, and the student scores for the mathematics subtest ranged from 156 to 182, with seven scoring 173 or higher. Table 2 provides the data for the practice Praxis I scores retrieved for Students 16-41.

Table 2

Practice Praxis I Scores of Students by Subtest (n = 26, 150 ≤ x ≤ 190)

	Subtest Score		
Student	Reading	Writing	Mathematics
16	156	160	161
17	165	170	162
18	177*	173*	169
19	170	170	172
20	170	NT	182*
21	160	168	166
22	158	150	172
23	175*	172*	172
24	170	171	174*
25	160	167	162
26	160	172*	162
27	170	169	156
28	178*	166	174*
29	181*	171	169
30	158	171	179*
31	168	169	179*
32	166	164	164
33	171	176*	171
34	164	171	169
35	156	160	160
36	165	169	161
37	166	172*	175*
38	160	161	167
39	153	168	166
40	168	170	167
41	171	170	175*

* Denotes passing score

The practice Praxis I exam subtest scores provided in Table 2 were those recorded after the TEP established the protocol of offering a practice Praxis I test.

Reading Subtest Results

The Praxis I reading subtest scores ranged from a 156-181. The minimum passing score was a 172. Four students had scores in the 150s, 19 students had scores in the 160s, 12 students had scores in the 170s and one student scored a 181. Nine students passed the Praxis I reading exam. Of the 12 students scoring in the 170s, eight of them passed the test. Four of them were within two points or less from a passing score. This information indicates the need for remediation in order to increase scores.

Writing Subtest Results

The Praxis I writing subtest scores ranged from a 150-176. The minimum passing score was a 172. One student had a score of 150, 22 students had scores in the 160s, 17 students had scores in the 170s, and one student did not take the writing portion. Eight students passed the Praxis I writing exam. Of the 17 students scoring in the 170s, eight of them passed the test. Nine of them were within two points or less from a passing score. This information indicates a need for remediation in writing.

There was an essay component to the writing subtest. Scoring of the essay portion used a 0-12 scale. The essay was subjective material; since a possibility of bias from the person scoring the test may affect the score, assigning a score of six to all practice essays avoided bias.

Mathematics Subtest Results

The Praxis I mathematics subtest scores ranged from a 156-182. The minimum passing score was a 173. One student scored a 156, 22 students had scores in the 160s, 16 students had scores in the 170s. Twelve students passed the Praxis I mathematics exam. Of the 16 students scoring in the 170s, 12 of them passed. Six of them were within three points or less from passing. More students passed the mathematics test the other tests. This finding indicates that students need some remedial intervention to increase test scores.

Data Analysis Findings

RQ 1

What is the current impact of remedial course completion on participant admission to the TEP? I discovered that so few of the teacher candidates took the remedial course this question really had an unusual answer. The current impact of the remedial course completion on participant admission to the TEP had no impact at all. Because only 11 of 41 students took the remedial courses, the remedial courses had little impact on the current problem. That in itself was a significant finding. If the students did not take the available courses, they could not be of any assistance to them. I concluded that students did not take advantage of the local settings remedial course offerings. The courses did not count toward a degree and they add extra time to the college experience. Regardless of the reasons behind it, remedial course completion had little impact on the current problem.

Coverage of reading did not take place at all in the remedial courses; therefore, impact on the reading subtest scores did not take place. Remedial courses instructed some writing skills, but not the application of those skills. Mathematics courses had the practical application needed to attain minimal required scores on the Praxis I mathematics subtest.

RQ 2

What are the characteristics of the remedial courses? The answer to this question came from the course syllabi and textbook information. First, I noted that the two mathematics courses required concurrent enrollment, and the same was true for the two English courses. Computer tutorials were the most used method of instruction for the Writing Improvement course and the Math Improvement course. The tutorials reinforced the teachings in the English/Grammar course and the General Mathematics course. The descriptions of the two improvement courses labeled them as 'labs' for the two instructional courses. The syllabi stated clearly the objectives and the course content was strictly from the textbooks. The textbooks used straightforward directions and were common to the discipline.

I took note that the students did not encounter the type of questions used on the Praxis I writing or reading subtests. Questions in the remedial course were the same type of questions in every English book I encountered. The students study a specific element of the English language and then they received testing on that specific element. Exposure to various elements in conjunction did not occur. The writing test had two portions; there was a multiple-choice portion and an essay portion. The wording of the writing multiple-

choice portion of the test had no coverage in the English remedial courses. There was no reading remediation offered. Students read two novels, but there was no instruction in reading strategies or comprehension skills needed for Praxis I reading subtest success.

Mathematics questions and language did not change, regardless of the environment. I noted that the international students tend to do well on the mathematics test. Three data sets were international students (n = 41) in the study, but past performance of international students upholds that observation. The mathematics remedial courses provided instruction that would benefit TEP students on the Praxis I mathematics subtest. The textbook and syllabi covered all mathematics elements needed to be successful on the Praxis I mathematics subtest with the exception of data analysis.

RQ 3

What evidence indicates the course is promoting appropriate content and skill sets for preparing teacher candidates to pass the Praxis I? This question tied closely to Research Question 2. As stated above, the instructors of the mathematics remedial courses instructed students on the content and skills needed for mathematics subtest success. The English remedial courses did not benefit students in taking the Praxis I writing or reading subtests. Part of the content received instruction, as noted by the textbooks and syllabi, but in a very different way than the test. The Praxis I writing subtest questions had wording that is different from what students encounter in the courses. Instruction of reading, as tested on the Praxis I, did not take place. Students needed reading strategies for comprehension for exam success. Colleges expect students to know reading strategies before they arrive at college. Therefore, a provision for a

course to teach reading strategies and skills did not exist. International students did not do well on the reading or writing portion of the Praxis I. However, if English was the second language, it affected test scores.

RQ 4

What specific student or group needs are evidenced by the aggregation of the data collected on the remedial course/program? The data did not identify a specific group that needed more help than any other group. The student demographics identified the majority of the students were white, college-age, females. The sample was too small to make any assumptions regarding specific groups.

The student scores on Praxis I actual and practice subtests underscores the need for intervention. While many scores were below the passing mark, several of the students were only two points below the passing mark. According to Praxis I data, that very well could be one missed question away from passing the test. If areas of deficiency received attention in any course before taking the Praxis I subtests, success could result.

Due to data findings, the project of creating an alternative remedial program seemed the best answer. Some of the content received coverage in the remedial courses. There was a significant gap in the writing coverage and reading received no instruction. Creation of a white paper to explain a detailed course of action resulted.

Remediation of mathematics typically was easiest to accomplish. The existing math courses aligned well with the tested content. The math textbook contained a comprehensive overview of most mathematics principles and skills. According to the syllabus, coverage of all chapters took place within a 16-week semester. If the entire

textbook received coverage, students should be well prepared to take the Praxis I math content subtest. The only significant problem with the math course was the accelerated coverage of the material. If a student did not know the information already, one week per chapter would not allow for learning a new skill. According to statistics, math skills often need revisiting for students who have not used a skill for a while (Asera, 2006). Adult students returning to school or college age students who took math courses early in their high school years may need a review of skills to be ready for college level mathematics (Bahr, 2012). Therefore, I concluded that the mathematics remedial course would be sufficient for students taking the Praxis I, if they simply needed a 'brush up' of skills already learned. The only content not covered in the course was analysis of data skills. Data analysis skills receive instruction in the teacher education courses, so the remedial course should touch on the topic. It would also benefit students to be exposed to mathematics questions from the Praxis I practice subtest. All students would benefit from exposure to data analysis question, as many real world applications require data analysis.

Unlike the mathematics, the English courses did not align well with the reading or writing subtest content. At least eight questions on the writing exam did not receive any coverage in the course material. There were six questions on parallelism and two questions on idioms. The textbook contained a chapter on parallelism, but according to the syllabus, the instructor chose to skip that chapter. Information on idioms was not available in the textbook, nor identified in the syllabus as a topic. There was not a course, nor formal instruction in reading strategies. The English/Grammar course required reading two novels, but discussions did not provide the tools necessary to be successful

on the Praxis I reading subtest. While the English/Grammar and Writing Improvement courses provided some needed practice, it was not enough to pass the Praxis I writing or reading subtests.

Central Question

I concluded that the answer to the central question, what is the current effectiveness of the existing remedial program in preparing teacher candidates to pass the Praxis I, was complex. The mathematics instruction was sufficient to meet the needs of the TEP students. The English instruction was not sufficient to the meet the needs of the TEP students. The following section details the RQ results and evidence as supported by the data.

Results

RQ1

In order to answer RQ1, I analyzed the remedial course participation of the students who took the actual or practice Praxis I subtests. Participation in the local school's remedial courses did not appear to have enough impact to create passing subtest scores for more than one student in the mathematics and one student in the reading course. Therefore, the answer to RQ1 was remedial course completion had little if any impact on admission to the TEP.

Of the 41 students represented in this data set, 18 students completed remedial courses. All students who completed remedial courses took them within the first two semesters of college, which was prior to attempting entrance to the TEP. Of these 18

students with remedial history, nine were from Students 1-15 (actual Praxis I subtest scores and the other nine were from Students 16-41).

Actual Praxis I exam data. Of the nine students in the actual Praxis I subtest group, six students completed remedial courses at a community college (English/reading, $n = 1$; mathematics, $n = 3$, both, $n = 2$) and three at the local school (English, $n = 1$; mathematics, $n = 2$). Three of these students enrolled in multiple remedial courses or took courses more than one time. Because of this fact, the nine students logged remedial history in a total of 19 courses, 16 from community college, and 3 from the local school. Table 3 displays the actual Praxis I test scores of students who took remedial courses, the number and type of remedial courses taken, and the location of the course.

Table 3

Actual Praxis I Subtest Scores of Students 1-15 with Remedial History (n = 9)

Praxis Subtest Scores				Remedial Courses Completed				Course Location	
Student	Reading	Writing	Mathematics	Eng	Rdg	Math	Writing/Grammar	CC	Local
1	169	168	164	1	1	0	0	☑	--
7	169	171	172	2	0	4	0	☑	--
8	173*	169	167	0	0	1	0	☑	--
9	172*	168	166	0	0	1	0	☑	--
10	173*	169	182*	1	0	0	0	--	☑
11	173*	166	168	0	0	1	0	☑	--
12	164	166	174*	0	0	1	0	--	☑
13	168	172*	169	0	0	1	0	--	☑
15	178*	160	166	3	0	2	0	☑	--
Total	5*	1*	2*	7	1	11	0	6	3

*Denotes passing scores

Of the nine student scores in the actual Praxis I exam data set, seven had passing scores in at least one subtest. All seven of these students completed remedial courses, but only three took a remedial course related to the passed subtest. One of the three took three remedial courses in the subtest that received a passing score. Of the 19 remedial courses taken by these nine students, 11 of them were by a student that passed at least one of the Praxis I subtests. Moreover, of the students who did not pass the Praxis I subtests, seven scores were within 4 points of passing the respective Praxis I subtests.

Only three students took remedial courses at the local university in this data set. Of the three students who took a remedial course at the local university, one student took a remedial course in the subtest passed. The only scores relevant to the RQ were the three taken at the local university.

Practice Praxis I exam data. Of the nine students in the practice Praxis I subtest group, one student completed remedial courses at a community college and the local university. This one student took seven remedial courses at the community college (English/reading, $n = 3$; mathematics, $n = 4$) and eight at the local school (English/writing, $n = 6$; mathematics, $n = 6$). Three of these students enrolled in multiple remedial courses or took courses more than one time. Because of this fact, the nine students logged remedial history in a total of 19 courses, seven from community college and 12 from the local school. Table 4 displays the practice Praxis I subtest scores of students who took remedial courses, the number and type of remedial courses taken, and the location of the course.

Table 4

Practice Praxis I Subtest Scores of Students 16-41 with Remedial History (*n* = 9)

Praxis Subtest Scores				Remedial Courses Completed				Course Location	
Student	Reading	Writing	Mathematics	Eng	Rdg	Math	Writing/ Grammar	CC	L
16	156	160	161	0	1	4	2	☑	--
17	165	170	162	0	0	2	0	--	☑
25	160	167	162	0	0	2	1	--	☑
27	170	169	156	0	0	1	0	--	☑
30	158	171	179*	0	0	0	1	--	☑
31	168	169	179*	1	0	0	0	--	☑
35	156	160	160	0	0	0	1	--	☑
39	153	168	166	0	0	1	1	--	☑
41	171	170	175*	0	0	0	1	--	☑
Total	0	0	3	1	1	10	7	1	8

*Denotes passing scores

Of the nine students in the practice Praxis I exam data set, three had passing scores in at least one subtest. All three of these students completed remedial courses, but none of the students took a remedial course related to the passed subtest. Of the 19 remedial courses taken by these nine students, three of them were by a student that passed at least one of the Praxis I subtests. Moreover, of the students who did not pass the Praxis I subtests, seven scores were within 4 points of passing the respective Praxis I subtests.

Eight of the nine students took remedial courses at the local university in this data set. Of the eight students who took a remedial course at the local university, none of the students took a remedial course in the subtest passed. Eight student scores were relevant to the RQ.

Remedial course history from local school. Three students who took the actual Praxis I subtests took remedial courses at the local university. Eight students who took the practice Praxis I subtests took remedial courses at the local university. Eleven students from both subsets took courses at the local university. Five of the 11 students at the local university took the mathematics remedial courses. The mathematics courses required concurrent enrollment at the local university. One student who took mathematics remedial courses at the local university passed the Praxis I mathematics.

Seven of the eleven took English and grammar courses. Of the seven who took remedial English courses at the local university, one passed Praxis I reading. None of the students passed Praxis I writing. Of the students who took remedial courses at the local university (n = 11), six passed one or more of the tests, but only one passed in the area in which they took remediation.

Table 5 detailed the history of students who took remedial courses at the local university.

Table 5

Student Remedial History at the Local Setting, (n = 11)

Student	Reading	Writing	Mathematics	Remedial Courses Completed			
				Eng	Rdg	Math	Writing/Grammar
10	173*	169	182	1			
12	164	166	174*			1	
13	168	172*	169			1	
17	165	170	162			2	
25	160	167	162			2	1
27	170	169	156			1	
30	158	171	179*				1
31	168	169	179*	1			
35	156	160	160				1
39	153	168	166			1	1
41	171	170	175*				1

*Denotes passing scores

Table 5 detailed the remedial history of students who took remedial courses at the local setting. The table displays the lack of assistance provided by the local remedial courses to TEP students in achieving minimum required scores on the Praxis I subtests.

RQ 2

In order to answer the second research question, what are the characteristics of the remedial courses, I completed an in-depth analysis of each remedial course offered at the local university. The participating local university offered remedial courses in grammar/English/writing and mathematics, instruction that should improve Praxis I

scores in the respective subtest. In order to analyze the remedial courses I used the syllabi and textbooks to check for alignment with the Praxis I content. The Praxis I reading content received no coverage in the current remedial offerings. Partial coverage of the writing content of the Praxis I occurred in the current remedial courses. The mathematics course encompassed the majority of the Praxis I content.

Remedial courses for reading. The remedial courses used at the local setting were Writing Improvement and Grammar/English. A requirement stated that the courses require enrollment in conjunction with each other. The Grammar/English required reading of two novels, *Ethan Frome* by Edith Wharton and *In His Steps* by Charles M. Sheldon. The syllabus stated that the books were tested, yet no instruction took place regarding comprehension, fluency, paragraph analysis, supporting main idea, or inferential reasoning. Simple reading of a book, including a novel, does not promote the content tested on the Praxis I reading subtest. Instruction of reading strategies did not take place; the expectation was that students already knew how to apply those skills.

Remedial courses for writing. The remedial courses the local setting used were Writing Improvement and Grammar/English. A requirement stated that the courses require enrollment in conjunction with each other. Both courses promote writing skills. Students who required the remedial courses could not enroll in the for-credit required courses of Writing I or II.

According to the syllabus for Writing Improvement, it served as a lab for the Grammar/English course. The Writing Improvement syllabus stated, “The instructor uses primarily a computer tutorial program supplemented by worksheets done as group work.”

The computer tutorial questions dealt exclusively with sentence structure, the writing process, and purposes for writing. The course design proposed to assist students in constructing better-written work. There was no textbook listed for the Writing Improvement course. The written work requirement for the course included writing of simple sentences. According to syllabi, the written work comprised one-fourth of the final grade for the course. According to the syllabus, the course dealt exclusively with sentence construction and the writing of three separate paragraphs. There was no opportunity to engage in creative writing to improve writing skills needed for the Praxis I.

The other course, Grammar/English used the textbook, *The Dolphin Writer, Book 1, Building Sentences and Composing Paragraphs*. According to the syllabus, coverage of a chapter from the textbook took place weekly. The syllabus stated that chapters one thru nineteen with exception of chapter ten received coverage in the course. Chapters 1-9 covered the parts of speech and simple sentences. . According to the syllabus, chapter 10, Parallelism, did not receive coverage in the course. Chapters 11-19 covered the writing process and simple paragraph construction. Tables 9-14, provided in RQ 3, detailed the alignment of content between the Praxis I subtests and the remedial course content.

Students were required to write sentences and three separate paragraphs. Daily quizzes over the material taught and the Writing Improvement computer tutorials reinforced the material. Coverage of the parts of speech, punctuation, and capitalization took place throughout the text.

Remedial courses for mathematics. The remedial courses used were Math Improvement and General Mathematics. A requirement stated that the courses require concurrent enrollment in conjunction with each other. According to the syllabus for Math Improvement, it served as a lab for the course, General Mathematics. The Math Improvement syllabus stated, "The instructor uses primarily a computer tutorial program." The listed course requirements simply state that, "students will be working through various tutorials on the computer." According to the syllabus, the tutorials reinforce material instructed in the general mathematics course.

The general mathematics course used the textbook, *Basic Mathematics* (2010). The text had 10 chapters with one chapter covered each week, with a test after every two chapters. Chapter 1 covered whole numbers and number sense. Chapter 2 covered factors and order of operations. Chapters 3 and 4 covered fractions. Chapter 5 covered decimals, and chapter 6 covered rations, proportions, and percent. Chapter 7 covered measurement and geometry. Chapter 8 covered statistics and probability. Chapter 9 and 10 covered algebra and algebraic equations. The mathematics textbook had chapters that cover all information on the Praxis I math practice subtest except the application of skills to perform data analysis. A detailed analysis of skills taught vs. skills tested took place in RQ 3. A table in RQ3 provided analysis.

Research indicated that mathematics remediation had better success than remediation in other disciplines (Oudenhoven, 2002; Attewell et al., 2006). Mathematics problem areas were often simply from not using a skill taught earlier (Parker et al., 2010). This section summarized the characteristics of the current remedial courses.

RQ 3

In order to address the third research question, What evidence indicates the course is promoting appropriate content and skill sets for preparing teacher candidates to pass the Praxis I?, I conducted an in depth analysis of the Praxis I Practice subtests and included the findings in order to compare them to the remedial course content. Presenting the findings through tables provided ease in analysis. I found that reading content received no instruction of value in accomplishing success on the reading Praxis I subtest. I also found that writing content in the remedial courses partially covered the skills needed to succeed on the Praxis I writing subtest. The mathematics course covered most of the skills needed to achieve a required minimum passing score on the Praxis I mathematics Praxis I subtest. I was unable to publish the questions from ETS's "The Official Practice Test Pre-Professional Skills Test (PPST)" for mathematics, reading, and writing (2009) due to copyright infringement.

Praxis I practice test content. I used the qualitative method of open coding. Open coding, according to Brott & Myers (2002) employs naming and categorizing data using scrutiny of the items in question. As the researcher, I used the ETS testing item analysis from the Praxis I practice subtest exam guide to begin my analysis. The ETS item analysis was included with the Praxis I practice subtests. ETS provided analysis on the actual exam score sheets, but without access to the particular questions, it was difficult, if not impossible, to determine a specific student need. The practice Praxis I subtests provided questions as well as primary skill identification in order to assist

students in determination of skills needing remediation. The primary skill identification was too broad to offer specific skill deficit identification.

I created sub-categories to align tested material to text/syllabi listed information. I chose sub-categories for the tested items by using the course textbooks and key words in the subtest questions. I used the ETS answer sheet and explanations of the Praxis I practice subtests to assist in sub-areas. Most of the information needed to identify a particular skill came from the explanation of answers, provided in the ETS practice test analysis.

Writing sub-test question analysis. ETS provided, through their practice test booklet, an analysis of the Praxis I writing practice subtest question primary skill needed for each question. The three primary skills identified by ETS were grammatical relationships; structured relationships; and idiom, word choice, mechanics, and correct usage. I chose sub-skills after reading each question carefully and identifying the skill needed to answer the question. Sub-skill identification used textbooks and the explanations provided by ETS in the practice subtest answer key.

The writing test had more sub-skills than the other tests. The primary skills identified by ETS were extremely broad and did not provide specific skill identification. The analysis tables 6, 7, and 8 below detailed the skill necessary to answer each question. The tables provided the ETS skill and the sub-skills identified by me. Inclusion of skills in the remedial course required checking the textbooks and syllabi to determine if the necessary skill received instruction in the remedial course. I created each table to include the question number, ETS's primary skill, sub-skills, and a yes /no format regarding

instruction of the material in the course. There were three separate tables based on ETS's primary skill designations for the writing Praxis I practice subtest.

Table 6 displays the information on each question using ETS's primary skill "grammatical relationships." The table included the practice subtest item number, the sub-skill identified by me, if the appropriate remedial course taught the information, the textbook chapter containing the information, and what week the instruction took place.

Table 6

Writing Praxis I Practice Subtest Analysis: Primary Skill: Grammatical Relationships

Item #	Sub-skill	Taught Y/N	Chapter #	Week instructed
1	Plural	Y	7	8
2	Subject-verb agreement	Y	6	6
5	Verb form	Y	4	4
9	Subject-verb agreement	Y	6	6
10	Adjective choice	Y	5	5
13	Noun agreement	Y	3	3
15	Adjective vs. adverb	Y	5	5
21	Adjective-noun agreement	Y	5	5
22	Verb tense	Y	4	4
25	Noun-pronoun	Y	7	8

Table 6 displays the grammatical relationships information on the Praxis I practice writing subtest. Ten items contained information using grammatical relationships. The syllabus and textbook for the two remedial courses stated that the information received instruction within the course.

Table 7 displays the information on items that had structural relationships as the primary skill needed. The table included the practice subtest item number, the sub-skill identified, if the appropriate remedial course taught the information, textbook chapter containing the skill, and the week instruction took place. I checked the syllabus and textbook to see if the skill received inclusion in the course.

Table 7

Writing Praxis I Practice Subtest Analysis: Primary Skill: Structural Relationships

Item #	Sub-skill	Taught Y/N	Chapter #	Week Instructed
12	Verb tense	Y	4	4
20	Phrasing	Y	1	1
23	Parallelism	N	--	--
24	Predicate construction	N	--	--
26	Parallelism	N	--	--
27	Coordinating conjunctions	Y	8	9
28	Sentence structure	Y	2	2
29	Parallelism	N	--	--
30	Conjunction use	Y	2	2
31	Dangling modifier	Y	5	5
32	Conjunction agreement	Y	2	2
33	Subject/wordiness	N	--	--
34	Parallelism	N	--	--
35	Double negative	Y	5	5
37	Dangling modifier	Y	5	5
38	Pronoun use	Y	7	8

In Table 7, 16 questions required application of knowledge concerning structural relationships. The syllabus and textbook for the two remedial courses stated that the information received instruction within the course, other than parallelism, predicate construction, and wordiness. The textbook for the Grammar/English course contained a

chapter on parallelism, but the syllabus stated that the chapter on parallelism did not receive inclusion in the course. Wordiness, per se, did not receive instruction, though sentence structure was a cornerstone of the course, according to available documentation. The word predicate did not appear in the textbook.

Table 8 displays the item numbers that required application of skills using idiom and word choice, mechanics, and correct usage as the primary skills needed. The table included the practice subtest item number, the sub-skill identified, if the appropriate remedial course taught the information, textbook chapter number containing the information, and the week instruction took place. I checked syllabus and textbooks for skill inclusion in the remedial course.

Table 8

Writing Praxis I Practice Subtest Analysis: Primary Skill: Idiom and Word Choice, Mechanics, Correct Usage

Item #	Sub-skill	Taught Y/N	Chapter #	Week Instructed
3	Mechanics semicolon	Y	8	9
4	Idiom use	N	--	--
6	Incorrect idiom	N	--	--
7	Mechanics comma	Y	12	13
8	Mechanics apostrophe	Y	12	13
11	Mechanics capital letter	Y	13	13
14	Mechanics comma	Y	12	13
16	Word choice	N	--	--
17	Word choice, sentence structure	N	--	--
18	Word order	Y	6	6
19	Word choice	N	--	--
36	Verb tense	Y	2	2

Table 8 provides the item numbers of subtest questions that used skills that pertained to idiom and word choice, mechanics, correct usage. Twelve questions required application of knowledge concerning idioms and word choice, mechanics and correct usage. The syllabus and textbook for the two remedial courses stated that the information

received instruction within the course, other than idioms and word choice. Idioms did not receive coverage in the textbook. Instruction in the course did not include word choice.

One course used computer tutorials to supplement the textbook information instructed in the instructor-based course. The writing subtest analysis showed that much of the material received coverage in the current remedial courses. Eleven questions refer to skills that did not receive coverage in the course. According to the analysis of Praxis I subtest questions, it was determined that much of the information receiving instruction in the remedial courses is tested material. Most writing skills received adequate instruction in the remedial courses. The effects of the course did not show positive results based on Praxis I practice or Praxis I actual subtest scores. Writing had three main concepts not receiving instruction. The three areas were idioms, parallelism, and word choices. There was evidence that the textbook had adequate coverage of parallelism, but experienced exclusion from instruction according to the syllabus. Idioms and word choices were not present in the syllabus nor textbook.

Reading subtest question analysis. The Praxis I practice subtest question analysis occurred in connection with the ETS provided analysis. ETS provided, through their practice test booklet, an analysis of each reading practice subtest question. ETS designated each reading question as either Literal Comprehension or Critical/Inferential Comprehension. I analyzed the questions further. I categorized Literal Comprehension questions into main idea, supporting idea, organizational relationships: (cause/effect; compare/contrast; problem solution), organization (transitions) and vocabulary. I categorized Critical/Inferential Comprehension into argument evaluation (critical),

inferential reasoning, and generalizations. The analysis chart detailed each questions' specific issue. Once each question received analysis for skill needed, a check for alignment between the curriculum and tested material, included material from remedial course textbooks, syllabus, and supplemental material. Information collected checked for skill inclusion in the curriculum. Two tables display the reading information. Each table has the Praxis I practice subtest item number and sub-skill. According to available documentation, no reading skills received instruction in the remedial courses. Since no instruction in reading took place, it was unnecessary to include a column regarding instruction in the remedial course, textbook chapters, or week instruction took place.

Table 9 displays the questions that have literal comprehension as the primary skill needed. It includes the Praxis I practice subtest item number and the sub-skill identified.

Table 9

Reading Test Analysis: Literal Comprehension

Item #	Sub-skill
1	Main idea
4	Main idea
5	Supporting idea
6	Main idea
8	Supporting idea
10	Main idea
11	Organization, transition words
14	Vocabulary
15	Organizational relationships
17	Main idea
18	Main idea
20	Supporting idea
21	Vocabulary
22	Organization relationships
24	Main idea
26	Organizational relationships
28	Main idea
33	Main idea
38	Supporting idea

Table 9 displays nineteen questions used skills needed for literal comprehension. The syllabus and textbook for the two remedial courses do not instruct any reading, according to available documentation. Table 9 showed details of skills needed to answer literal comprehension questions successfully. There was a need for a reading skill acquisition course because no instruction of reading strategies took place. The information contained in Table 9 and Table 10 underscores the need for a course designed for college reading skills and necessary interventions needed in a remedial course.

Table 10 displays the Praxis I practice reading subtest item numbers that had critical and inferential comprehension as the primary skill needed.

Table 10

Reading Test Analysis: Critical and Inferential Comprehension

Item #	Sub-skill
2	Inferential reasoning
3	Inferential reasoning
7	Inferential reasoning
9	Inferential reasoning
12	Generalization
13	Generalization
16	Argument evaluation C*
19	Argument evaluation C*
23	Argument evaluation C*
25	Generalization
27	Inferential reasoning
29	Generalization
30	Inferential reasoning
31	Inferential reasoning
32	Generalization
34	Inferential reasoning
35	Generalization
36	Argument evaluation C*
37	Inferential reasoning
39	Argument evaluation C*
40	Inferential reasoning

*C denotes Critical Reasoning

Table 10 displays 21 questions that required critical and inferential comprehension. The syllabus and textbook for the two remedial courses did not instruct

any reading, according to available documentation. All courses required a student to be able to read, but did not provide instruction in college level reading.

Mathematics subtest question analysis. ETS provided, through their practice test booklet, an analysis of each mathematics question. ETS designated each mathematics question as one of the following, Numerical Knowledge, Understanding Algebra, Geometric Relations, or Math Application. I analyzed the questions and divided the primary skill numerical knowledge into numbers and operations. I sub-divided algebra into algebra and algebraic equations. I identified two subskills in geometric relations, geometry and measurement. Math application included the sub-skills of data analysis and probability. The further skill analysis allowed me to compare course content with Praxis I practice mathematics subtest content.

Alignment of the analysis of questions with course data identified if appropriate content received attention in the remedial courses. Correspondence between the existing course materials with the Praxis I tested material showed evidence of the effectiveness of the remediation process on campus. The syllabi and textbook provided evidence of information receiving instruction in the remedial courses. The mathematics tables contained the item number, the sub-skill, if the material was taught in the remedial course, the textbook chapter that contained the appropriate skill, and the week in which instruction took place.

Table 11 displays the Praxis I practice mathematics subtest item numbers that applied numerical knowledge. Numbers and operations were the sub-skills identified in the numerical knowledge primary skill. The syllabus for the mathematics remedial

courses identified Chapters 1 and 2 of the textbook that contained instructional activities using the two sub-skills.

Table 11

Mathematics Test Analysis: Numerical Knowledge

Item #	Sub-skill	Taught Y/N	Chapter #	Week Instructed
2	Numbers	Y	1	1
10	Numbers	Y	1	1
13	Operations	Y	2	2
15	Operations	Y	2	2
16	Numbers	Y	1	1
21	Numbers	Y	1	1
23	Operations	Y	2	2
25	Operations	Y	2	2
27	Operations	Y	2	2
29	Operations	Y	2	2
31	Operations	Y	2	2
33	Numbers	Y	1	1
35	Operations	Y	2	2

Table 11 displays 13 questions that applied numerical knowledge. The syllabus and textbook for the two remedial courses in mathematics stated that the information received instruction within the course. As with writing, one course used computer

tutorials to supplement the textbook information instructed in the instructor-based course. The mathematics test analysis showed that much of the material received coverage in the remedial courses.

Table 12 displays the Praxis I practice mathematics subtest item numbers that required the primary skill of understanding algebra. The sub-skills chosen were algebra knowledge and algebraic equations that applied skills of understanding algebra and knowledge of algebraic equations. Table 12 contained the item number, the sub-skill, if the material was taught in the remedial course, the textbook chapter that contained the appropriate skill, and the week in which instruction took place.

Table 12

Mathematics Test Analysis: Understanding Algebra

Item #	Sub-skill	Taught Y/N	Chapter #	Week Instructed
6	Algebra knowledge	Y	9	12
9	Algebra knowledge	Y	9	12
11	Algebra knowledge	Y	9	12
22	Algebraic equations	Y	10	14
24	Algebraic equations	Y	10	14
34	Algebraic equations	Y	10	14
37	Algebraic equations	Y	10	14
40	Algebraic equations	Y	10	14

Table 12 displays 8 item numbers from the Praxis I practice mathematics subtest that used algebra concepts. The syllabus and textbook for the two remedial courses stated that the information received instruction within the course. Chapters 9 and 10 contained information regarding skills associated with algebra and algebraic equations.

Nine of the Praxis I practice mathematics subtest items required knowledge of geometric relations. The sub-skills identified in the geometric relations primary skill were geometry and measurement. Instruction of all geometry and measurement information took place during week ten of the course and from textbook chapter 7. Therefore, I concluded that all geometry and measurement question information received coverage. One course used computer tutorials to supplement the textbook information instructed in the instructor-based course.

Table 13 displays the Praxis I practice mathematics subtest item numbers of questions that used mathematics application as the primary skill. The sub-skills identified for mathematics applications were data analysis and probability. Table 13 displays the item number, the sub-skill, if the material received coverage in the remedial course, the textbook chapter that contained the information, and the week in which the information received instruction.

Table 13

Mathematics Test Analysis: Mathematics Applications

Item #	Sub-skill	Taught Y/N	Chapter #	Week Instructed
1	Data Analysis	N	--	--
3	Data Analysis	N	--	--
7	Data Analysis	N	--	--
12	Probability	Y	8	11
18	Data Analysis	N	--	--
20	Probability	Y	8	11
26	Probability	Y	8	11
28	Probability	Y	8	11
32	Data Analysis	N	--	--
36	Data Analysis	N	--	--

According to Table 13, 10 questions required mathematics application concepts. The sub-skills identified in mathematics applications were data analysis and probability. Six questions dealt with data analysis and the textbook and syllabus contained no evidence that data analysis received instruction.

The mathematics skills received instruction in all but one area. Data analysis questions did not receive instruction. Data analysis skills were used daily by teachers and represented important concepts that were not receiving instruction. The textbook and syllabus had no examples of data analysis questions or skills needed to perform data

analysis. Once again, mathematics skills received instruction, but did not have a marked effect on Praxis I test scores.

RQ 4

In order to address the fourth research question, What specific student or group needs are evidenced by the aggregation of data collected on the remedial course/program?, I analyzed all data collected for this study. I viewed the actual and practice Praxis I subtest scores to determine the number of points needed for a student to achieve the minimum required score. I determined what skills did not receive instruction in the remedial courses, but were present on the Praxis I subtests. The evidence collected pointed to several areas of deficit for TEP students. Adequate addressing of all tested material did not take place in the remedial courses.

Praxis I: Actual and practice subtest scores. According to the data collected, a significant portion of the Praxis I subtest scores did not meet minimum requirements. Actual Praxis I test contained four (n = 15) reading subtests that met minimum requirements, three (n = 15) writing subtests that met minimum requirements, and five (n = 15) mathematics subtests that met minimum requirements. Practice Praxis I tests contained three (n = 21) reading subtests that met minimum requirements, five (n = 21) writing subtests that met minimum requirements, and seven (n = 21), mathematics subtests that met minimum requirements. Seven (n = 41), 17% of the reading subtest scores met the required minimum score. Eight (n = 41), 20% of the writing subtest scores met the required minimum score. Twelve (n = 41), 29% of the mathematics subtest scores

met the required minimum score. The data provided evidence of a significant score deficit for TEP students on the Praxis I exam.

Praxis I practice reading subtest. Praxis I reading subtest scores showed significant evidence of deficit. Twelve (n = 41) student scores were within five points of the minimum score requirement. Reading for TEP students was a significant area of deficit. The local remedial courses did not instruct any college level reading at all. TEP students needed experience with texts that assisted them in reading for purpose, main idea, and paragraph analysis. A course designed specifically for TEP students focusing on reading skills for teachers required exploration. A score of 172 was required to pass the Praxis I reading sub-test. Five student scores passed the Praxis I reading sub-test. Since there was no instruction in reading, the local remedial course was not responsible for the passing score. In order to assist students in achieving the minimum score requirement on the Praxis I reading subtest, some type of remediation in reading skills and strategies merited discussion. One student who took the local remedial courses passed the Praxis I reading subtest. The student took the English course; evidence does not provide proof of any affect from the remedial course.

Praxis I practice writing subtest. Praxis I writing subtest scores had the most encouraging basis for remediation. While the scores that met the minimum requirement, 11 (n = 41) were not equal to the reading, the number of students within five points or less of the minimum requirement were encouraging. Twenty (n = 41), 50% writing subtest scores were within five points of meeting state requirements. The test scores were either passing, within five points, or more than 10 points from the passing score. This

seemed to signify that students needed either slight remediation or intense remediation, based on previous test scores. The minimum score required by the state on the Praxis I Writing subtest was 172.

The remedial courses instructed many of the skills needed for the Praxis I writing subtest, as evidenced by the comparison of tested-material to instructed-material. According to the comparison, the writing subtest had two skill sets that did not receive instruction, and thus, areas of deficit in the courses. The two areas not included in the material used in the remedial course were parallelism and idioms. The addition of parallelism and idioms to the current courses would eliminate the deficit from the course. Practice in writing using prompts provided by the Praxis I practice test would better prepare TEP students for success. The subset scores of students who took the remedial courses at the local university showed no effect on the Praxis I writing subtest scores. Only one student who took remedial courses at the local university achieved the minimum required score on the writing subtest, but the student took the mathematics remedial courses, therefore, there was no evidence of the current remedial courses targeting writing assisted students on the Praxis I writing subtest.

Praxis I practice mathematics subtest. Praxis I mathematics subtest scores were the most interesting. Twelve mathematics subtest scores met the minimum requirement, 12 (n = 41). Ten (n = 41), 25% of the mathematics subtest scores were within five points of meeting state requirements. Most of the remaining scores, 19 (n = 41) were 10 or more points from the minimum required score. The mathematics scores, much like the writing scores, seemed to signify that students needed either slight remediation or intense

remediation, based on previous test scores. The minimum score required by the state on the Praxis I mathematics subtest is 173.

According to the comparison of tested material to instructed material in the mathematics content area, remedial courses showed that the majority of material tested received instruction. The main skill set missing from the remedial curriculum was data analysis. The addition of data analysis to the curriculum would allow the remedial mathematics courses to cover all the necessary skills addressed on the Praxis I mathematics subtest. Remediation in mathematics is historically easier than remediating any other subject. Simply reintroducing a student to a skill that has become rusty from disuse remediates many student deficits. The design of the current courses sought to reintroduce skills, not teach them from the beginning. If a student needed intense skill instruction, the remedial course likely was enough. Only one student who took the local mathematics remedial courses achieved a passing score. It was determined that the mathematics courses did not show evidence of affecting the mathematics Praxis I subtest scores to any significant degree.

Generalizations supporting the needs for remedial courses. Another fact that emerged from the collected data regarded the issue of students simply not taking the remedial courses. After analysis of the data, I surmised that if TEP students took the remedial courses, it could result in better scores on the Praxis I subtests. A need for more research in the area of TEP students and remedial courses existed. Most TEP students were not required to take a remedial course upon enrollment because their admission test scores were sufficient.

Based upon evidence collected, there was not a significant effect of any remedial course on Praxis I subtest scores, regardless of the location of the course. Since all students who took a remedial course did so within the first year of college, I noted that taking a remedial course closer to the timing of taking the Praxis I might be significant. The 'use it or lose it' mentality could have led to diminished scores.

Assurance of Accuracy and Credibility

The basis for inductive analysis relied on discovering patterns, themes, and categories with the data (Hatch, 2002). The entire study plan looked at discovering to what extent alignment exists among the existing remedial courses and the Praxis I exam as well as congruency with other data that emerged from the inquiry. The Praxis I had a nationally recognized coding system. The coding system was extremely broad and assisted in finding out what students needed to study in order to perform well on the exams. The Praxis I, as a national normed test, assured accuracy in the data. Refining a coding system based on Praxis I categories set forth by ETS allowed me to design sub-categories. While the actual test was not available due to copyright infringement, the design of the practice test provided by ETS made it an excellent example of the actual test questions.

Test scores and remedial performance assessments of past and present students outlined the need for an intervention strategy that targeted Praxis I skills. Because the official ETS database and the university registrar provided the scores, the scores were accurate and reliable. The university registrar provided official transcript information with final remedial course grades. The TEP database provided Praxis I practice and actual

subtest scores. Practice Praxis I exams were administered and assessed by the TEP administrative assistant. Actual Praxis I exam test score analysis were provided by ETS. I kept the archived information on tables to assist in keeping the information accurate. I checked the information from the database 10 times and kept accurate records of the information to be included in the study tables.

The remedial course data came primarily from the syllabi for the courses and the textbooks. All syllabi included detailed assignments that were accessible from the text. The college provided me with copies of the textbooks for my use to eliminate the problem of searching for the texts. The University Registrar provided the syllabi, which were the official course syllabi on file for the accreditation agency. Southern Association of Baptist Colleges accredited the university; therefore, the syllabi and textbooks achieved credibility.

Accuracy was important to any study. To maintain accuracy in the findings, different data sets were cross-referenced to check for accuracy and to clarify any emerging themes. I used integration of the descriptive data with qualitative findings to create a holistic perspective on this problem and an appropriate project to address this local school's concerns.

Student Praxis I subtest scores were stored in the student electronic files, known as the TEP database; the State Department of Education had a master list for comparison purposes. The administrative assistant or the official registrar of the university compiled and maintained official data and, therefore, not subject to misinterpretation. Teacher education files had test scores provided by ETS and their analysis on official

watermarked documents. Therefore, it was a matter of simple compilation of the findings, and no manipulation of the findings was possible. All insufficient student scores were included. The registrar and the TEP database ensured reliability and credibility due to the standards set forth by the university for data security and accuracy

Limitations

The generalizability of the study was a definite limitation. Since the course and the guidelines for Kentucky EPSB set Praxis I score minimums, the results reflected Kentucky standards. The results interested other Kentucky educators as EPSB encouraged TEP's to create remedial options for students. Because this study was a case study, the intent was not to generalize the findings but rather to accurately report the local situation as it currently existed.

The small size of the local setting added an additional limitation within the confines of Kentucky. The local setting provided a limited sample, simply because the school itself and the TEP by association were small. This obviously made the results reflective of the local student body rather than providing findings that would naturally transfer to other TEPs. Other universities still may use the findings as a starting point in creating their own studies.

Other colleges, especially those with TEPs, could use the results to assist them in choosing better options for underprepared students. Remedial courses and their assistance or lack thereof to education students could have universal applications. Findings could assist future research on remedial alignment with teacher education basic skills.

Procedures for Discrepant Cases

A discrepant case, according to Cohen, Manion, and Morrison (2011) was a case that does not meet the parameters set by the study. In this study, that was not an issue because all included information was regarding students who do not meet Praxis I requirements. There was a limited possibility of discrepant cases in the student information. All of the test scores and Praxis I information was accredited by ETS. All test scores pertinent to the study were those that did not meet the minimum required score to pass; therefore, all of the data collected was similar in that regard. No comparisons took place between students who passed and those who did not. My intent was to describe accurately the local situation as a means of investigating how the remedial courses were or were not meeting the needs of teacher education candidates. This study's design excluded comparisons between students. Due to the study's design parameters, no discrepant cases were present.

Role of Researcher

I was an assistant professor in good standing at the local university. I was a faculty member and worked in the teacher education department as an instructor and supervisor of student teachers. The study involved students not yet formally admitted; I had no instructional contact with the de-identified students. The administrative assistant de-identified all data analyzed in this study. This provided me with data containing no identifiers of individual student identities. Because I have a stake in the local schools TEP program and want it to be successful, I recognized the need to minimize any existing bias. Archived and de-identified data ensured there were no participants and risks

associated with my role and this research. Departmental ETS documents provided the basic codes needed to compare Praxis I tested information with remedial course objectives. I created sub-codes to pinpoint skills needed.

Data Analyses Tracking Systems

I created tables to keep data accurate. I reflected on emerging trends as they became evident. The most significant fact that emerged was the under-utilization of the existing remedial program by the students. When I collected the transcripts from the registrar, I noted that 11 students ($n = 41$) took the remedial courses offered at the local university and only one of the 11 students took and passed the Praxis I in the area in which remediation was received.

I kept all data sets collected in labeled binders and on computer files. The binders remained locked in a file cabinet for the duration of the study. The computer files were password protected on a secured network.

Evidence of Quality

I transcribed all information obtained from the TEP database and the university registrar onto tables and spreadsheets. I stored all hard copy information in binders and computer files. Both the TEP database and the university registrar keep and maintain official records that required reports to an outside accrediting agency. Accuracy in all records was paramount for state certification for TEP students. The state required passing Praxis I scores for admission to any teacher education course other than Introduction to Education. Verification of the passing scores too place for admission to occur.

The sanctity of the registrar of a university was beyond reproach. Generated and submitted items from the registrar included all official transcripts, attendance records, and official documents. In order for a university to obtain and maintain accreditation was through the proper submission of official documents. Due to the importance of such material, the Registrar checks and rechecks all information. Due to the official capacities of both areas that provided information, insurance of the quality required no extra verification.

Project Based on Findings and Outcomes

The central research question of, what is the current effectiveness of the existing remedial program in preparing teacher candidates to pass the Praxis I, was answered through the data findings. Answers to all sub-questions evolved from the data collected. Each question had specific data that assisted in answering the question.

I concluded that the answer to the central question was complex. The mathematics instruction was sufficient to meet the needs of the TEP students. The English instruction was not sufficient to the meet the needs of the TEP students. Therefore, the direction of the project was to create a white paper to recommend a course of action to assist TEP students through the design of a specific remedial course for the reading and writing portions of the Praxis I subtests.

Conclusion

The central problem of underprepared students embarking on a college degree pursuit has led to the increased need for remedial courses (Greene & Foster, 2003; Parker et al., 2010; Rose, 2010; Tritelli, 2003). Though some scholars were against offering

remedial courses in college, the continuing arrival of students lacking basic skills necessary to complete a college degree program render remedial courses necessary (Levin & Calcagno, 2008; Rose, 2010). Though effectiveness of some remedial programs was questionable, remedial courses were necessary for some students (Parker et al., 2010). Remedial programs were the best solution to a diverse problem (Jenkins & Boswell, 2002; Rose, 2010). Though not generally claimed to be successful, the most common remediation strategy was the drill-and-skill method (Deli-Amen & Rosenbaum, 2002). The research suggested using strategies different from those used in the past as a suitable alternative to traditional remedial instruction (Boylan, 1999; Rose, 2010).

A great deal of the research identified successful teaching strategies for programs (Bettinger & Long, 2009; Levin & Calcagno, 2008). Available research does gave credence to the outcomes of several remedial programs that used approaches different from drill-and-skill (Parker et al., 2010). Some program models were innovative in many educational settings, though they were not necessarily new (Bettinger & Long, 2009; Parker et al., 2010).

Through the study, I determined that the existing remedial program on the local level provided benefits in mathematics, but not in English. Therefore, the project suggested a solution for TEP students to fill the gap in practice at the local venue. A direction of social change led by the study could lead to the design of novel approaches or individualized remedial instruction based on specific needs. Any efforts to improve the success of underprepared student groups are beneficial, as it levels the playing field for students to have equal opportunity to contribute to their local and state communities. The

project could affect social change, especially in Kentucky TEPs. Teacher education was concerned with training excellent future teachers. Some students could be excellent teachers with instruction in developing skills they were not equipped with upon college entry. This issue involved social change in that the nation, as a whole, was concerned with making our educational system stronger. In order to strengthen our education system, we must first equip our students with the skills necessary to be competitive in the global market. Kentucky's EPSB was interested in the results in order to share them with other Kentucky TEPs. Since Kentucky changed the standardized test requirement to mandatory testing using the Praxis I, a need for study courses not yet designed, implemented, or evaluated exists. The study provided assistance to Kentucky TEPs in designing new remedial programs to assist teacher education students. Section 3 provided an overview of the project that resulted from the data analysis in this study.

Section 3: The Project

Introduction

Remedial programs are a necessary part of the college landscape. Remediation is a variable in a heated debate regarding underprepared students in higher education. Certain basic skills are required to be successful in college, and many students arrive underprepared for the rigor of college courses. In the local setting, teacher education hopefuls were required to have a skill set that aligned with expectations on the Praxis I tests. When I examined the existing remedial program and Praxis I content, I determined that the existing remedial program was not adequate for assisting prospective TEP students. While the mathematics courses provided practice in needed skills, the English courses did not do much to assist students. The project that evolved from the data was a white paper that refuted use of the current remedial program for TEP students. An in-depth analysis of the tested content and the taught content indicated the gap between the courses and the content needed. The following section provides a blueprint of a new course for TEP students with a foundation in theory.

Description and Goals

I determined from the data that the existing remedial program was inadequate for preparing TEP students for the Praxis I. Therefore, the existing remedial course needed updating. Data indicated that the students had not used the remedial course to its potential, and I could not determine any influence on the students taking the Praxis I. When comparing the Praxis I question content with the remedial course instructional content, I noticed significant gaps specifically in the area of reading. Therefore, I

concluded that the project should focus primary attention on the reading and writing Praxis I material. My analysis of mathematics content takes place first because mathematics remedial courses needed the fewest changes to make them effective.

Description

The project was a white paper proposal for additions and eliminations of the current remedial courses based on a curriculum evaluation. I compared the material the Praxis I evaluates with the material presented in the remedial courses at the local setting. Using the information from the data, I created a white paper to inform stakeholders and make suggestions to improve the remedial offerings to assist TEP students.

A curriculum evaluation using Tyler's model led to the development of a white paper to assist the university in revising the remedial offerings. According to Guba and Lincoln (1981), researchers conducting curriculum evaluation attempt to answer two questions: (a) Did a course of study achieve desired results? and (b) What improvements could be made to course offerings? Both of these questions were at the center of the desired result to improve TEP student scores on the Praxis I exam through improvement of the existing remedial courses. Assessment of the value of a program of study, field of study, or course of study can include a curriculum evaluation (Glatthorn, Boschee, Whitehead, & Boschee, 2012). I performed curriculum evaluation to make recommendations in a white paper to the university administration. Based upon several models of curriculum evaluation, I chose Tyler's Objectives-Centered Model for the project. Tyler's model was appropriate because of its ease of use and seven systematic

steps (Glatthorn et al., 2012) to apply to an existing course of study (Tyler, 1950). The attached project details the seven steps and results based on findings.

The mathematics remedial courses were adequate but underused. If students in the TEP program took the mathematics course at the appropriate time during their college program, they were prepared for the Praxis I mathematics subtest. The additions to the mathematics course included exposure to questions from the Praxis I practice test to prepare students for the exam. The only content area not covered was analysis questions. Addition of analysis questions was warranted because TEP students evaluate data in the pedagogy courses. However, the project focused on writing and reading because the current remedial courses in English did not prepare students to take the Praxis I reading and writing subsections.

I made suggestions to add to the existing courses to cover Praxis I tested information. I supported the creation of a new course centered on the reading test and study skills needed for Praxis I success. I included additional suggestions for improving the remedial experience at the local university.

Mathematics remediation. The mathematics course had a curriculum and textbook that contained material necessary for Praxis I success. Possible reasons for the lack of impact on test scores include students taking the course too early in their college career, not reviewing material prior to the test, or not having developed the skills needed to address a specific problem. The mathematics course included one chapter per week, and this was a rapid pace for students having trouble acquiring basic skills. If students needed a review in mathematics to refresh existing skills, the format worked. If students

did not have a knowledge base in the existing skill, one week was not sufficient to promote mastery of the skill (Bettinger & Long, 2009). The remedial course in mathematics needed minor revision. According to recent studies, mathematics is the easiest discipline to remediate (Attewell et. al. 2006; Barbatis, 2010; Oudenhoven, 2002). According to the Praxis I study guide, the questions on the Praxis I mathematics subtest are similar to any multiple choice mathematics standardized tests. The format used on the Praxis I mathematics subtest was not unfamiliar to students who had taken a mathematics course or test before. However, according to the literature the computer-based tutorial was not viewed as a best practice in mathematics skill acquisition. I suggested the addition of data analysis to the existing course.

Reading remediation. Reading does not receive any attention in the current courses. Students should be able to read upon embarking on a college degree, but the ability to read the words is not enough. If students are not equipped with reading strategies, study habits, frequency speed, and reading for comprehension, they are not ready for the Praxis I reading subtest. I recommended a new course promoting development of particular skill sets required to achieve a sufficient score in the reading subtest. The project included components recommended for Praxis success in reading.

Writing remediation. The existing remedial courses addressed some of the necessary writing skills for Praxis I success. The existing courses did not cover at least two areas tested on the writing subtest. Students who incorrectly answer questions in these two areas could fail to achieve a score sufficient for admission to a TEP. Another problem with the writing instruction was lack of attention paid to writing that needed

correction. In addition to being able to write, a student must know how to use language and how to analyze the writing of others. Adding the instructor-eliminated chapter from the textbook would provide coverage of tested material. With the addition of information and questioning styles, most of the writing information would receive coverage in the existing course. Exercises that encouraged students to practice writing and correcting the work of others would better prepare them for the Praxis I writing subtest.

Goals

The central goal was to assist TEP students in producing state-required test scores for admission to the local TEP. Instruction in Praxis I content was necessary to achieve that goal. I wanted to affect other remedial students as well. Many students were unprepared for college and I wanted to have a positive impact on their courses. I illuminated the problem of underprepared students in order to make changes to better serve TEP students.

The main goal was designing courses that would help students increase their Praxis I subtest scores. I recommended creation of materials that targeted specific skill sets tested by the Praxis I. The creation of new courses was a likely result because students typically populating remedial courses were not TEP students and would not benefit from course changes. The remedial courses were sufficient for the needs of non-TEP students. Only TEP students were required to take the Praxis I for program admission. Praxis I skill development was unique to TEP students; therefore, the creation of a course specifically designed for TEP students was logical.

Rationale

I suggested a new course for reading and the addition of material to cover tested areas in mathematics and writing. I chose this particular project because I could address the problem of underprepared students. Preparing TEP students for success on the Praxis I addressed the problem of students who could not achieve sufficient scores. By promoting instruction in tested materials in the Praxis I format, I could reduce the debilitating results currently caused by inadequate preparation.

Data analysis in Section 2 supported the choice of project. The analysis of student Praxis I practice subtests and actual subtests revealed a significant problem with student scores. The comparison of tested information with remedial course content illuminated the information missing from the course. Another significant issue was the presentation of material. The Praxis I had specific questioning strategies. Praxis I questions were worded differently from other national tests students had taken. Increasing TEP students' exposure to Praxis I sample questions was crucial. The practice Praxis I tests allowed students to become familiar with Praxis I questioning formats. If similar questions were used in the course, students could become familiar with the format, which would reduce test anxiety.

Addressing TEP students' problems with Praxis I would result in better prepared students, which would lead to an increase in admissions. Providing remediation specific to the TEP candidates' needs was appropriate to address the problem in this study—a gap in preparedness of TEP candidates. Because the existing remedial programs did not assist

TEP students, a course specific to Praxis I preparation seemed appropriate in addressing university and student needs.

Review of the Literature

The issue of underprepared students was a problem for colleges and universities everywhere (Parker et. al., 2010). Remedial programs were available at most colleges and universities nationwide (Attewell et al., 2006). Although remedial programs had a long and turbulent history in education, remedial education was necessary for many (Rose, 2010). Without remedial education, many students would never succeed in college. Most remedial courses applied the drill-and-skill method, though drill-and-skill was not considered best practice for remedial education (Bettinger & Long, 2009). Most high school educational settings used some form of drill-and-skill; however, if students did not learn the material presented in that form, then they would likely not learn it from the same or a similar approach later on. The drill-and-skill approach used in remedial programs was not as productive as other available alternatives (Levin & Calcagno, 2008). College instructors and researchers need to seek innovative approaches, test them, and replicate them (Levin & Calcagno, 2008). Researchers supported programs that encouraged colleges to make changes based on facts (Levin & Calcagno, 2008).

A second popular teaching method in remedial courses was computer-based tutorials (Bailey, 2009). Older students found this method less helpful than traditional-age students (Grubb, 1999). Studies indicated a steady decline in students' writing skills since the 1970s (Lingwell, 2010), and Lingwell (2010) blamed technology and computer writing for much of the decline. In addition to the technology issue, removal of an

instructor appeared to impede students' ability to ask questions. Underprepared students were at risk for failure, and connections were essential for success. While computer-based instruction had positive effects on children with specific academic needs (Clarfield & Stoner, 2005), there was no definitive evidence that it worked for adults. Two of the current remedial courses were strictly computer based. Although practicing the skills for the course was encouraged, minimal instructor assistance was provided. This led to students' disinterest in reading and answering questions, and encouraged guessing to complete the required hours on the computer. Students had the option to continue guessing on the computer tutorial until they entered the correct answer; however, explanations or other examples were not provided. Supplemental instruction was often drill and skill transferred to the computer; this type of instruction was ineffective with students who were already struggling (Grubb, 1999). Grubb (1999) also noted that "it is foolish to think that students who have never learned to read for meaning can suddenly learn in sixteen weeks what they failed to learn in the same manner for twelve years" (p. 5). The current remedial course at the local college employed both drill-and-skill and computer-based tutorials.

Knowledge of basic skills was not the only component many students were lacking. According to Conley (2007), students needed four key skills for college readiness: cognitive strategies, content knowledge, academic behaviors, and contextual skills. Key cognitive strategies included reasoning and problem solving. Conley defined key content knowledge as "writing skills, algebraic concepts, and foundational content and 'big ideas' from core subjects" (p. 2). Conley also pointed out that students must be

able to manage themselves to be successful, including time management and study skills. Knowing content was not enough to be successful in college. Many students had underdeveloped study skills (Rachal, Rachal, Daigle & Rachal, 2007). According to Rachal et al. "many student do not develop effective learning strategies unless they receive explicit instruction and then the opportunity to apply these skills" (p. 195). Many college students expected explicit direction regarding what they were expected to study without actively discovering anything on their own, and did not know how to adapt to a different educational environment (Stanley, 2010). The local college had added a course for freshman that was intended to equip students with study habits for success. All students were required to take the course. Implementation of higher order thinking skills, such as critical thinking and problem solving, perhaps especially in remedial courses beneficial results (Boylan & Saxon, 2005). Embedding critical thinking and basic skills in remedial courses help students retain the skill targeted (Oudenhoven, 2002).

Reading and writing skills required instruction in context (Oudenhoven, 2002). Traditional remedial courses, used rote and repetition, and did not encourage intellectual discourse or higher order thinking skills (McCabe, 2003; Oudenhoven, 2002). Most drill-and-skill used contrived reading, designed for low reading levels and did not promote comprehension skills that transfer to other settings (Oudenhoven, 2002). Grubb (1999) suggested that having students correct their own writing assignments engaged students in real-world work application and promoted the transfer of skills into practice. In order to improve reading skills the use of actual, meaningful college texts required implementation (Boylan & Saxon, 2005). Use of random mistakes in writing promoted

skills that transferred into other venues (Grubb, 1999). Strategic reading worked well with underprepared students (Caverly, Nicholson, & Radcliffe, 2004). Many underprepared students had difficulty discerning important information from unimportant information, and trouble transferring strategies to other courses (Caverly et al., 2004). Reading was often harder to remediate than other subject areas (Adleman, 1999). If a student did not acquire basic skills in elementary school, it was difficult to assist college students in acquiring them (Adleman, 1999). Reading for comprehension was necessary in college, as research has shown, 85% of college learning required careful and meaningful reading (Simpson & Nist, 2000).

Teacher candidates needed relevant assessments of their skills and content knowledge to become successful teachers (Wang et al., 2010). It is imperative that teacher candidates be proficient in content knowledge and have the ability to break down content and teach it to children (Wang et al., 2010). It is necessary for teacher candidates to be masters of the content they are responsible to teach to children, but it is also necessary that they be able to instruct the content to the students they teach (Wang et al., 2010). In order to teach something to others, a working knowledge of how the skill/content makes sense is necessary (Arendale, 2005; Vygotsky, 1978; Wang, et al. 2010). Clear learning outcomes need designing to make a smooth, sequenced, and logical progression through the necessary subject matter (Wang et al. 2010; Dewey, 1958). Therefore, remedial efforts for teacher candidates need a serious understanding of content knowledge to achieve success (Wang et al. 2010). Highly trained, competent teachers are

a staple element in effective schools (Scheeler, 2007). Teachers cannot generalize skills they have not learned themselves (Weiss & Han, 2005).

Basic knowledge is necessary; there is a direct correlation between underprepared students to inadequate teachers (Gitomer, Brown, & Bonett, 2011). Gitomer et al., (2011) recognize the Praxis I as a standard basic skill assessment needed for teacher candidates because it receives use by 27 states to screen teacher candidates. In a study by Gitomer et al., (2011) students expressed three problems with the Praxis I. The problems identified were bias against groups not exposed to the tested content, test anxiety, and never learning how to take a test (Gitomer et al., 2011). This directly supports exposure to test questioning strategies that include questions based from the test format and practice using testing skills. Since basic skills testing is required for admission to TEP and the Praxis I receives recognition as a standard skill measurement tool, adequate preparation for the Praxis I is necessary. "Content knowledge is assumed to be acquired as part of the program of studies that leads to successful completion of teacher preparation programs" (Gitomer et al., 2011).

Students are arriving at college underprepared by their P-12 education (Gitomer et al. 2011). TEP's are now required, according to Gitomer et al., (2011), to be "engaging in significant remediation and repair of an inadequate P-12 education" (p.435). TEP's need to provide a preparatory course for the Praxis I; the remediation should provide testing skills and practice with similar questions to the Praxis I in addition to content basic skills preparation (Gitomer et al 2011). Allowing students with like backgrounds and similar

under preparedness issues to study together increases the success of a remedial course (Barbatis, 2010).

Remedial efforts needed specific direction if successful results were the desired result (Rose, 2009). Putting students into social learning communities improves basic skill acquisition (Barbatis, 2010). Bandura (1977) and Dewey (1958) identified social learning and practice with skill acquisition resulted in better-educated students. Barbatis (2008) suggested that developmental course delivery needed to change because most instructors of developmental courses used teaching techniques similar to those used in high school. It makes sense that innovative techniques are necessary to direct student learning that are different from previous educational instruction (Barbatis, 2008). Barbatis (2008) observed that student integration into learning communities promoted skill retention. Learning communities focused on the education of the whole student rather than only academics (Perin, 2006).The importance of remedial students in learning communities was identified as early as 1977 by Roueche and Snow. The term learning community was not in common usage, but the theory of students being educated holistically was present. Learning communities and supplemental course instruction strengthen remedial skills (Arendale, 2005). Smith (2010), regarding learning communities, reinforced the idea that remedial courses unitizing the learning community component resulted in an increase in learning. Although Smith's (2010) research focused primarily on students who were English second language, the research supported that the relationships students develop within the learning community and support from college gave the struggling students an attitude to achieve. Tinto (1998) and Bloom and Sommo

(2005) conducted studies that have shown learning communities as positive, especially for remedial students. Minkler (2002) defined a learning community as a way of "deliberately structuring the curriculum so that students are actively engaged in sustained academic relationship". Students engaged in assisting one another promoted skill attainment and retention (McCabe, 2003).

Hinshaw et al. (2010) employed constructivism and social learning theory in a teacher based study. The project attempted to equip teachers with useful strategies for themselves and their students (Hinshaw et al., 2010). Constructivism and social learning theory have been large parts of education for years (Bandura, 1977). Both theories encouraged self-teaching and sharing information within a group dynamic (Hinshaw et al., 2010).

Research supported that a learning community of similar students, who desired the same educational acceptance into a TEP, and who needed instruction in basic skills would benefit from a course specifically designed for teacher candidates (Wang et al, 2010; Wilson, 2010; Hinshaw et al., 2010). Designing a course with the Praxis I format receiving use and employing constructivist theory was the basis for the project. Through the study, the current remedial program had deficits in areas relating to TEP students.

The purpose of developmental education is the ability to develop in each student the skills and mindset necessary for success in college and beyond (McCabe, 2003). Levin and Calcagno (2008) sought to point out that successful interventions needed a variety of types to accommodate the diversity of students themselves. In order for remediation to be successful, remedial courses, need to add college preparatory facets

that develop study skills, and time management skills in addition to basic skills (Boylan, Bonham, & Rodriquez, 2000). Diversification of the student body led to the need for diversity in the delivery and structure of remedial courses. The solution to success of a remedial program goes beyond academic preparation; remedial courses must take a holistic approach to address academics and personal development (Perez, 1998). McCabe (2003) suggested that remedial programs needed customization as much as possible. It is not feasible to customize to individuals, but it is reasonable to tailor a program for students in a certain area of study to optimize instruction (McCabe, 2003).

Implementation

Designing a course for TEP students required examination of skill deficits from Praxis I practice subtests. It required examination of the existing textbooks from current classes to seek to determine what was missing in the current remedial courses that TEP students needed. In order to determine if the course achieved success, scores from the course and future Praxis I subtests results required analysis. Using the analysis of the practice subtest missed questions; I determined that writing and reading were not receiving proper instruction to assist TEP students. In order to provide better service to students, I designed a white paper for administrators to use, as a guide to create new course for the English disciplines needed for the Praxis I reading and writing subtests.

Mathematics

The mathematics course had instruction for all needed skills. The only addition to mathematics I suggested was to add a math practice subtest to the course to give students practice using the correct format. The mathematics subtest was so similar to other

mathematics tests on similar exams, such as the ACT, so even the format for mathematics was not critical to success. The practice materials were available on computer; therefore, incorporation into the computer tutorial course made sense. Since all mathematics content skills received adequate instruction, the project's focus revolved around reading and writing.

The computer tutorial course needed to add an instructor's presence and remove the ability to guess until answers were correct. Students did not read explanations after incorrect answers. Explanation of the material and reasoning behind correct answers benefited skill retention. The presence of an instructor encouraged students to ask questions to understand the questions and answers. The addition of practice Praxis I questions, though the questions were not different from other tests, benefited the students taking the subtest.

Reading

The reading tested information had no instruction whatsoever. Reading strategies and fluency exercises did not receive instruction in colleges and universities. With a timed exam, it was important for students to read quickly and with intent. The strategies of skimming, reading questions first, context clues, and other reading strategies needed instruction for students to be successful. It was true that most of these strategies receive instruction in elementary school; however, in colleges and universities, they do not. Reading strategies, in a new course, fell under study skills. Reading exercises, in conjunction with study skills, were beneficial to students in taking the Praxis I exam. The reading and writing tested content and skills benefited from a combined course effort.

Using the computer tutorial course time to assist students in making connections between the two disciplines leads to a connection between skills.

Writing

The writing course had limited instruction in the necessary items on the Praxis I. During the research phase of my study, I discovered there were two specific topics that did not receive discussion in the remedial course. Parallelism and idioms comprised eight of the questions on the Praxis I practice exam. Missing eight questions caused a student to miss enough to not reach the minimum score requirement. The textbook for the writing improvement course had a chapter on parallelism, but according to the syllabus, the instructor chose to skip the chapter. It was unclear why this chapter did not receive coverage in course. Idioms were not a topic covered in the textbook or mentioned in the syllabus. I think a writing course with all the topics covered on the practice subtest would be extremely beneficial to students. Another problem for students was the format of the subtest itself. The format of the Praxis I exam was unlike other multiple choice writing tests. Specific skills were necessary to answer the questions successfully. The wording was different and the skills needed were critical thinking in nature. Without exposure to the types of questions used, answering the questions was difficult. Another component not instructed is the composure of an essay from a posed statement regarding educational topics. The remedial writing course composed sentences, and limited paragraphs, but that is all. The study guide on the Praxis I provides sample questions that require incorporation into writing prompts for class work. Going over student-completed essays for critical critique would exercise skills needed for success on the Praxis I writing

portion. One of the skills exercised on the multiple-choice section was the ability to select sentences with mistakes and choose the best substitution. Without critical thinking and deductive reasoning skills, it was difficult to choose the best answer.

The computer practice portion of the remedial course needed significant changes. First, the questions needed changing to the format of the Praxis I. Exposing students to the format and the question type better prepared them for the test. Instructor participation, explaining each question, regardless of student requests, adds to skill retention. Removal of the ability to guess and explanations that pop up on the screen for incorrect answers, added repetition of skills and content.

Learning Community

Creation of a learning community or cohort group benefited struggling students. According to the research, similar students benefited from studying together. The design of the TEP promoted bonds between students. TEP students navigated through the cycle together. Offering of TEP pedagogy courses occurs on a three-semester rotation, because the courses occur only in one section, so all students in the pedagogy courses went through them together. TEP students bonded significantly and many remained life-long friends. Therefore, building a learning community, as early as the first semester, benefited students on several levels. Research maintains that students who made connections early in their college career tended to complete a degree. Designing study groups and learning communities that practice specific study skills led to retention of the skill. It also led students to the realization that they are not the only ones struggling. Another benefit was the concept that often students can teach each other a skill when the

teacher cannot. Therefore, a learning community mentality within the remedial courses would benefit all the students. Implementation of new courses and addition to the existing courses required recommendation.

Potential resources and existing supports.

Existing remedial courses resulted in significant upheaval. All remedial course instructors desired to assist TEP students. The administration agreed to necessary changes with minimal changes in existing documents. The current instructors of the mathematics remedial courses implemented the needed skills and content without creating a new course. A remedial reading and writing course was more beneficial to TEP students if specific to Praxis I material and format. The university supported the remedial program creation for teacher education students. The English department faculty supported content instruction for TEP students and offered to allow TEP instructors to teach the course. While one of the remedial English courses benefited TEP students who simply needed to refresh skills already learned, many students needed a new course designed specifically for the Praxis I.

Potential barriers. The university approved the creation of a new course; approval of the curriculum committee was required. The curriculum committee approved the course addition to the schedule. Guaranteed approval from the curriculum committee was imminent, since the university was behind the creation of the course. Obtainment of the copyrights to use the Praxis I materials for questioning and explanations has occurred. The TEP purchased the e-books and practice subtest materials from ETS.

Proposal for Implementation and Timetable

The university gave permission to begin the course the next semester. Therefore, once I designed the course and gave suggestions to the existing course instructors, implementation of the timetable was immediate.

Roles and responsibilities of students and others. The only person with responsibility, other than me, was the mathematics instructor. He needed the mathematics practice subtest and explanations material to use in the existing course. Coverage of almost all mathematics components took place, with the exception of data analysis skills; therefore, addition of data analysis information needed implementation. He had awareness of the study I was working on and was supportive of adding any information I found necessary. Any student enrolled in the course became a member of a learning community.

The design of the new course for TEP students needed to implement the components detailed in the implementation section. Study skills, creation of a learning community, addition of information not covered, and exposure to Praxis I formatting comprise the body of material needed coverage. Students enrolled needed study skills and reading strategies before covering course work. Daily writing exercises and correction of existing writing samples were a necessary component as well. I am responsible for designing and teaching the course for reading and writing.

Project Evaluation

In order to check for effectiveness of the redesigned remedial courses, an evaluation of students who complete the course will be necessary. The university should

use TEP data collection to determine effectiveness of the new course. Students who take the practice Praxis I exam after completion of the course and achieve passing scores will prove the project partially successful. The actual goal was to determine if the existing remedial courses instructed Praxis I content. The study was needed to solve the problem facing TEP students; assist students in achieving passing scores on the Praxis I exam administered by ETS. I have no control over student attendance in the new course, nor do I know of students who seek tutorial services elsewhere.

The data sets necessary to evaluate the new course recommended in the white paper are Practice Praxis I scores, Actual Praxis I scores, grades assigned to TEP students in the remedial course, and student questionnaires. All of these data yield information on the success/failure of the new remedial efforts. Comparisons between past Practice Praxis I scores and the new scores can show insight into what students know or learn over time.

The evaluation of effectiveness hinges on students' performance in remedial courses and scores achieved on Praxis I, both practice and actual. I am unable to force students to take the actual exam; however, the students cannot gain acceptance into the TEP without required scores. Preparing students with a remedial course and practice Praxis I tests should improve the actual scores results. It will take several semesters to test the projects long-term effectiveness. Knowledge of content and skills implemented by the mathematics instructor and me and tested by the practice exam will yield information about effectiveness. The evaluation is both goal-based and outcome-based.

Evaluation Description

The goal of the project was to increase scores on the Praxis I exams to increase students gaining acceptance into the TEP. The project was a white paper suggesting improvements to instruct Praxis I content in the existing remedial courses. Outcome-based evaluation was more appropriate for the project. Students receiving instruction in necessary skills should produce the outcome of better-prepared students. The skills instructed were necessary for other areas of study, not just TEP students. Therefore, the actual anticipated outcome, results in better college students.

Attached in the appendix was a sample student survey. The questionnaire administered ten questions regarding Praxis I data from students. Actual and practice Praxis I test scores compiled from student files will exemplify improvement or lack of improvement of student scores.

If the project achieves results, the next step implements the course as a staple each semester. TEP students enroll in the course when they enroll in Introduction to Education if the student does not achieve the required score on a Praxis I practice exam. Students who achieve passing scores in Introduction to Education remain in the core learning community and a sub-community becomes created from the remedial group. The evaluation used formative assessment. The project evaluation takes place each semester and adjustments made for each individual group needs. Each semester, a frequency chart of missed questions on the practice exam directs instruction. The evaluation is never-ending, each semester yields valuable information for comparison.

Evaluation Justification

A frequency chart based on questions on the practice Praxis I exam checks the effectiveness of the project each semester. The evaluation needs to direct the instructors on which areas are a problem for each group and adjust the course as needed. After a student has taken the course, a re-test on the practice Praxis I exam yields some of the information needed to evaluate the effectiveness of the course/project. A questionnaire or open discussion with students in the course would assist in evaluation of the course. If the project does not yield results on the practice Praxis I exam, it is unlikely that students taking the actual test will achieve required scores. Therefore, the project will require adjustments to achieve the desired results.

Goal statement. The overall goal of the project was achievement of the minimal required scores for admission to the TEP. The study design identified areas necessary for achieving minimal scores and the project design was to implement the previously missing components to a new course. The evaluation goal relies on results in improved Praxis I scores for TEP students and an increase in student admission to the TEP.

Key stakeholders. The key stakeholders in the success of the project are the local elementary schools. Providing quality educators to elementary schools is the central purpose of any TEP. TEPs, however, are dependent upon student enrollment and admission. Elementary schools depend upon TEP's to graduate and train high quality educators, so elementary schools have a significant stake in the successful outcome of this project.

The other stakeholder is the local TEP. The lively hood of three faculty and staff members hinges on project success. The college also holds a stake in maintaining the TEP. The TEP is one of the most desired majors in the traditional student body. Without the TEP, many students would choose an alternative university that offered teacher education.

Implications Including Social Change

The goal of any study was to affect social change. In order to further the education of students, study was required to improve educational practices constantly. I chose to determine how to assist TEP students to gain admission into a TEP by analyzing the Praxis I required tested material to the current remedial course curriculum. The Praxis I is widely used by TEPs nationwide for acceptance into programs. The study and project could affect social change by starting a program of remediation led by desired teacher behaviors.

Possible Social Change Implications

Local community. The local community will benefit immensely from the project. A course to address the needs of TEP students is necessary for the continuation of the program. This will ensure the jobs of faculty members and assist the local college administrators in continuing to offer TEP degrees. Our students will benefit because they will be able to complete a valuable degree and benefit their families. Training well-rounded TEP students will lead to an influx of qualified educators to the local community. Many of our students get teaching jobs in other states and positively influence their teaching environments.

Larger context: Far reaching implications. This project has implications for the state of Kentucky. The president of the EPSB told me, that they would be interested in my findings. When Kentucky raised its standards for admission to TEPs, it has negatively affected enrollment. The EPSB wanted to assist colleges with TEPs in keeping their enrollment up with highly qualified students. The anticipated interest of other Kentucky TEPs is far-reaching, especially with the smaller colleges similar to the local context.

Use of the Praxis I in 27 states, and the expectation of that number to increase, this project could affect more than local and state TEPs. Kentucky educational reform started with KERA in the 90s and resulted in consideration of Kentucky as a force encouraging change in teacher education. Our local area has changed to standard-based grading and teacher fitness observations. Teachers are under a microscope nationwide and highly qualified teachers affect the students of the future.

Conclusion

Underprepared students embarking on a TEP degree provided a large portion of the enrollment, especially at small colleges similar to the local setting. The white paper project provided suggestions for additions and improvements to existing courses and the implementation of new course. Discovering student suggestions and impressions of the existing course and the new course will provide valuable data on what students need to prepare for the Praxis I. Accumulating test scores for both actual and practice Praxis I provides data on success or failure of the existing study materials. Evaluation of my project, dedicated to increasing local student scores on the Praxis I exam was never-ending. The project could influence students across the state and result in positive

implications for national assistance. The conclusion of this section transitions the project from planning to reflections in Section 4.

Section 4: Reflections and Conclusions

Introduction

Working on this project allowed me to develop as a scholar and to address a significant problem concerning the ability of TEP students to pass the Praxis I subtests. The creation of a white paper to assist in the creation of a new course and to improve existing courses allowed me to shape educational opportunities for my students. In Section 4, I examine the strengths and limitations of the project and address the problem of underprepared students. I also reflect on scholarship, lessons learned from project development, and leadership. This section also includes analysis of my development as a scholar, practitioner, and project developer. Finally, this section includes a description of the potential impact of the project, including opportunities for social change and directives for future research.

Project Strengths

The local university needed assistance to address the problem of underprepared TEP students. The study allowed for discovery of content and skill needs based on Praxis I identified study areas. Comparison of remedial courses with Praxis I content provided a direction for the project. I chose to construct a white paper detailing pertinent information for university personnel regarding TEP students' needs. I evaluated current remedial efforts in the context of state-required skill sets. Identification of student needs regarding Praxis I necessitated a curriculum revision of current remedial courses. I provided a systematic examination of each course and evaluated Praxis I content data based on Practice Praxis I test questions.

The Praxis I became a required part of TEP admission. Students on the local level were not meeting minimal required scores. The project allowed for analysis of specific information to identify a direction for a project. The Praxis I content and the current remedial courses needed evaluation for alignment. Without the study findings, a concise recommendation was unavailable. The curriculum evaluation allowed analysis of the current remedial courses without targeting instructor deficiencies. I identified missing content and did not assign blame for underprepared TEP students on instructors. As a result, instructors were comfortable with recommendations for the current courses. By comparing tested content with instructed content, I was able to provide a compelling and clear description of curricular deficiencies.

Math Strengths

The mathematics courses were adequate, and minor changes were sufficient. The recommendation included the addition of certain skill-development exercises and related questions requiring data analysis. The practice exam had eight questions requiring data analysis. Data analysis was not a skill covered in the syllabus or textbook. I also recommended using the subtest question format from Praxis I.

Reading and Writing Strengths

The two English courses lacked alignment with Praxis I reading and writing exams. Reading received no instruction in either course. Therefore, I recommended creating a reading course. The Praxis I practice exam included a basic skill set required for success on the exam. I tailored the design of a course to target reading strategies and content for TEP students.

One course, Grammar/English, proved sufficient with the addition of certain skill-development exercises. Exposure to Praxis I subtest question format and an addition of more strenuous writing assignments enhanced the existing syllabus to cover the missing elements. Most areas tested on the Praxis I writing subtest received coverage in the current course's textbook. According to the syllabus, one chapter did not receive coverage in the course, so that chapter should be reinstated. The only elements not covered in the textbook were idioms.

The Writing Improvement course lacked relevance. Alignment between the two current courses would be beneficial, but the course lacked practical application. The Writing Improvement course title was misleading because no writing was required. Students need practical application in editing and revising written work and practice in writing essay questions. Changing the computer format to the Praxis I format and aligning it strictly with the textbook material taught in the Writing Improvement course improved the quality of the companion course.

Learning Community

The final suggestion for the local university included formation of a learning community. Students learn better in a social environment with other students of similar skill level and interests. Putting underprepared students together in remedial courses and in beginning education courses allowed students to make significant connections that helped retain students until graduation. The local TEP already had a system that created a learning community within the pedagogical courses; however, promotion of an earlier learning community was needed.

Recommendations for Remediation of Limitations

Identification

One limitation was the focus. The study and project targeted TEP students at a small, Christian university. Therefore, the project, a white paper for the administration of the local university, had a narrow scope. The TEP was small, so the number of test scores was limited. Even though focusing on TEP students was a limitation, it was also a strength in some regards. The need in Kentucky for programs to assist TEP students in attaining minimum required scores on the Praxis I was significant. Other professionals at state meetings had expressed a need to intervene to save their programs. However, representatives from other states or the educational community at large could view the study as limited. The project evaluation required the implementation of some of the suggestions from the white paper. A new remedial course, taught by a TEP instructor, was the primary suggestion. The administration guaranteed implementation of the new course because alleviation of the problem facing the TEP was crucial for it to remain open.

A weakness was instructor availability for implementation. The remedial courses required instructor cooperation for successful implementation of Praxis I content and skills. To implement suggestions, instructor cooperation was imperative. The construction of a new reading course added to TEP instructors' workload. The TEP instructors are familiar with the Praxis I, and a TEP faculty member should teach the remedial course specifically aimed at Praxis I reading skills. Volunteering to teach a

course in an already overloaded schedule required dedication. A possible option required payment to the instructor for services.

Recommendations

The limitations were difficult to address. There was no real way to change the focus to reduce limitations. However, other states and universities with similar problems could use the study as a guide to create their own projects. Other states used the Praxis I as a TEP admitting standard; therefore, other instructors from other states could benefit. The existence of underprepared TEP students was not a problem unique to Kentucky.

Another way to address the limitations was allowing the current remedial courses to remain unchanged. The TEP could create a remedial program of its own to target only TEP students. This would allow non-TEP students to choose a different set of remedial courses to meet their individual needs.

Scholarship

The field of education requires constant professional development through study. Teachers never stop learning. Reading current research to improve and focus instruction is a major part of being a teacher. Teachers are always working to improve educational practices and advocate for positive change. Teachers are experimenters with innovative instructional practices. Teachers are scholars.

The literature reviews allowed for focused, extensive study on relevant topics related to the problem. I discovered that reading requires perseverance and patience. Looking for articles through a search was tedious and often unrewarded. Nevertheless, it was imperative to find scholarly writing on the topic.

As a scholar, I exhibited clear and concise writing. The art of professional writing took practice and use. I know that my effort at scholarly writing will positively affect future writing and will assist me in addressing other professionals.

Project Development and Evaluation

Producing a professional study and project profoundly influenced my teaching and continuing education. I already knew how to identify a problem and how to search for solutions. However, I had never done a formal project. The development of a researchable guiding question took me through a learning experience. I learned that study and research took time, patience, and perseverance. Creating a project from study findings required alignment with data. My ability to review literature improved dramatically. I learned about the importance of valid methodology in scholarly study. I learned that developing a project from research, with support from student examples, gives a project credibility and relevance.

I gained knowledge on project design models and implementation of projects. I also learned how to use scholarly discourse to convey the findings and project elements. Evaluation of projects is never finished. Evaluation is an ongoing process to continue to improve instructional practices.

Leadership and Change

I learned that in order to facilitate change, leadership was crucial. Change can lead to success with strong and flexible leadership. Support from co-workers and colleagues was also needed to guide change. In addition, I discovered how important supporting data was to facilitate change. Documentation can display the enormity of a

problem. I want a leadership position that helps promote positive social change. In order to effect change, effective leadership is required.

Analysis of Self as Scholar

A scholar is a person who is an expert in a particular area. I became an expert in the area of Praxis I preparation. I became proficient in remediation programs. I have grown in my educational background. Now I feel more confident to share my ideas with colleagues.

During this process, I learned that I will never stop learning and I will never stop working as an advocate for my students. Being an educator is not a job; it defines who I am. As a teacher education professor, I guide educational professionals for tomorrow. I effect social change by the job I do. I learned that I am a scholar in the field of education.

Analysis of Self as Practitioner

Analyzing myself was a difficult task. I learned that while I know a great deal about my subject, without research to strengthen my argument, change would not occur. I reflected on best practices and used prior research to drive my study project.

I learned a great deal about finding scholarly articles with educational merit. I learned that I have much to add to the area of teacher preparation, and I intend to use research findings to guide my future endeavors to be a leader in social change.

Analysis of Self as Project Developer

I learned that project development takes directive thinking. I used skills developed throughout my years in higher education. I implemented programs in the past, but someone else developed them. The experience allowed me to effect change not only in

the TEP, but in the remedial area as well. I learned many things about remediation that I did not know previously. I gained confidence in my ability to share findings with others in a respectful and thoughtful manner to aid student learning. I learned the importance of research-driven project development.

I learned that I could develop a carefully conceived project. I learned that I am competent in designing a project and a way to implement it. Presenting a clear project to colleagues is imperative for developing a successful project. I learned that I must be clear and concise in my writing for best results.

The Project's Potential Impact on Social Change

The study and project effected change on the local level. The new admission requirements had severely handicapped TEPs in Kentucky and had caused the need for intervention. Remedial courses were changed and the creation of a new course occurred. The work was important to the state of Kentucky TEPs. Students were not prepared, and the TEP was at risk of closing as a result. The EPSB asked me to share my research at a future meeting to assist other TEPs in creating remedial programs of their own.

The impact on the local level made the difference between the TEP closing and remaining open. The local TEP was small and could not withstand the loss of students. As a result, the project has the potential to positively affect local students in reaching their goal of becoming a teacher.

The project has the potential to effect social change within the state. Kentucky TEPs, especially those at small institutions similar to the local university, are in need of

an intervention strategy. This study and project could show institutional leaders a way to attack the problem and cause change within their educational programs.

Initiation of social change on the national level through Praxis I research could take place. Several states use the Praxis I. Underprepared students are a problem nationally; therefore, research on how students can prepare for Praxis I is relevant to social change.

Implications, Applications, and Directions for Future Research

This study addressed the problem of underprepared students entering college. TEPs are not the only programs affected by this problem. In this study, I described the problem in a local TEP, which mirrored the problems of other small universities in the state. The study indicated that existing remedial programs have much to offer, yet students do not choose to use them. Remedial programs could target TEP students with minor changes that could assist non-TEP students as well.

Future endeavors should focus on targeting Praxis I content. Exposure to content earlier, such as in high school, would better prepare students to take the test at entry level. Perhaps future researchers should focus on how Praxis I developers decided what was entry level. More research on remedial programs at the college level is needed. What innovative strategies work well with adults? Which ways to teach work best with underprepared students? Why are students arriving at college underprepared?

Conclusion

This section required me to reflect on my growth as a scholar, practitioner, and project developer. It required me to guide future research and define the significance of

my project. This journey through my degree program has strengthened my confidence as an educator. It has allowed me to pursue opportunities in other areas of higher education.

Finding an effective long-term solution to the problem requires additional research. This experience has guided me to become a leader in my profession and be proactive on social change issues. I discovered that in order to promote social change, constant study was required. I feel confident that leadership is a skill I now possess.

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Appendix A: Project

PRAXIS I PREPAREDNESS AND REMEDIATION PROJECT

The problem of underprepared students arriving at college, desiring to pursue an education degree has become an ongoing problem at a local university. As an Associate Professor in good standing, I have studied the issue to determine a way to alleviate the problem. Using a curriculum evaluation based from findings from student performance in remedial courses and practice exam content, I made recommendations to assist the TEP in readying students to take and pass the Praxis I exam. The findings support the addition of content to the mathematics course, and the creation of a reading remedial course. The writing remedial courses, while covering most of the content, still lacked connection between the course and tested content. Recommendations included the creation of and support for a learning community within the education courses and within the remedial courses. The following is a curriculum evaluation in the form of a white paper detailing support for the suggestions.

Curriculum Evaluation

In order to choose a suitable evaluation model, I used the text, *Curriculum Leadership: Strategies for Development and Implementation* (2012). Curriculum evaluation methods are plentiful. I considered several available models. I did not choose Bradley's Effectiveness Model because it lent itself to evaluation of an entire school year curriculum and district planning for an elementary or high school. Because the project dealt with a college course curriculum, Bradley's model was not well suited for the

current project. Bradley's model has ten steps that did not meet the needs of the problem solution.

Stufflebeam's Context, Input, Process, Product Model focused on generating much data to change current practices. While data guided the project, Stufflebeam's model focuses on generating data over time. The problem with Stufflebeam's model lies in the process of implementing alternative evaluation methods to determine if the old practices meet the needs of the setting. I did not use Stufflebeam's model because time constraints did not allow for implementation of alternative assessments and the generation of data. Stufflebeam's model required an evaluation of implemented elements.

Scriven's Goal-Free Model does not stand well alone as an evaluative tool. Scriven's model is qualitative in nature and focused solely on the perceived outcomes of a program. Scriven himself noted that his model was not a stand-alone model; it is more useful used in conjunction with a goal-based model. It is important to determine valued outcomes and unanticipated by-products of a program, but the current project does not measure these elements.

Stake's Responsive Model focuses on the concerns of the stakeholders, those concerned with the evaluation materials. Stake's model requires meeting with students, staff, and other interested persons. I discarded this model for the current project, as it was not possible to interview those involved.

Eisner's Connoisseurship Model deals with evaluation that hinges on qualitative appreciation. Eisner's model was one of the first models to rely completely on qualitative interpretive data. Perception is paramount in this model. I discarded this model because

of its subjective nature and the experience needed to effectively evaluate using this model. Furthermore, Eisner's model does not evaluate the curriculum in a measureable context.

I decided to use the Tyler Objectives-Centered Model, as it was the best suited for college and course evaluation. The Tyler model, "focuses attention on curricular strengths and weaknesses, rather than solely with the performance of individual students" (Glatthorn, Boschee, Whitehead, & Boschee, 2012, pg. 360). While student data are used to guide the assessment, the data is used to evaluate the effectiveness and appropriateness of the current remedial courses. Tyler's model had seven steps for evaluation of a curriculum:

- Step 1: Tyler stated the objective the course was supposed to teach, as stated in the syllabus.
- Step 2: Tyler required the assessment procedures used to measure the achievement of the objective from the previous step, also detailed in the syllabus.
- Step 3: Tyler required the selection of suitable evaluative instruments; in the project, I used the coded skills on the Praxis I practice subtests and the comparison of syllabus information to the tested content.
- Step 4: Tyler used the evaluative instruments to obtain results.
- Step 5: Tyler required comparison of the results from the evaluative tools to determine what students learned as evidenced by student data.

- Step 6: Tyler analyzed the results to determine strengths and weaknesses of the curriculum in current use. Explanations of possible reasons for the strengths and weaknesses required identification.
- Step 7: Tyler posed possible modifications to make the curriculum more effective for the students.

Using the Tyler Objectives-Centered model to evaluate the existing remedial courses resulted in the conclusion that the exiting courses need some modifications to be effective for teacher education students. The following curriculum evaluation details the findings. Tyler's 7-step model was applied to each course individually, with mathematics and English courses listed separately in each step.

The first section provided a list of Behavior Objectives for the Praxis I. Each of the four remedial courses then received analysis through Tyler's model of seven steps.

Behavior Objectives for Praxis I Exams

Reading

- Reading to prepare future educators.
- Emphasis on skills that is critical to learning and achievement in teacher preparation programs.
- Skills in the ability to understand, analyze, and evaluate texts of different kinds.
- Content based questions from a reading passage.
- All questions can be answered by using information contained within the passage, no questions requires outside knowledge of content.

Writing: Multiple Choice Questions

- Writing skills to prepare for college and career readiness.
- Use of Standard English correctly and effectively.
- Recognition of errors in grammar, punctuation, idioms, word choice, research, editing, writing process.
- Best way to restate a phrase.

Writing: Essay Questions

- Assess the ability to write effectively in a limited time.
- Two different types of writing are required, one essay is informative/explanatory, and the other is augmentative and informative/explanatory.
- Student writing is scored on central ideas, clarity, consistency of point of view, cohesiveness, strength and logic supporting information, rhetorical force, appropriateness of diction and syntax, correctness of mechanics and usage.

Mathematics:

- College and career readiness skills in mathematics.
- Number and quantity
- Algebra and functions
- Geometry concepts
- Statistics and probability

- Integration of mathematics skills to achieve a solution to a problem
- Knowledge of mathematical concepts of varying difficulty.
- Mathematics reasoning

The computer-generated test provided a calculator.

COURSE EVALUATIONS

ENG XXX Writing Improvement

Step 1: Behavioral Objectives

- Demonstrate knowledge of the process of writing.
- Demonstrate analytical and logical thinking through written communication.
- Consistently use correct grammar and language mechanics in their writing.
- Demonstrate their conception of faith and its impact on learning and living.

Step 2: Assignments Designed to Evoke Behaviors

- Computer tutorial completion

The syllabus states, "The instructor uses primarily a computer tutorial program supplemented by work sheets done as a group". The listed activities of simple sentence creation and parts of speech identification occur in a tutorial or in group worksheet situations.

Step 3: Evaluation Instruments

- Frequency of missed questions on Praxis I practice exams (Writing)
- Coded skills from Praxis I practice guide and skills coded by researcher
- Praxis I Objectives provided by ETS study guide
- Syllabus from course

The frequency chart and coded skills provided a base of knowledge needed to successfully achieve minimal scores on the Praxis I exams. The Praxis I study guide provided a list of skills tested.

Step 4: Results

Based upon the objectives provided by ETS of information tested on the Praxis I exam, ENG XXX Writing Improvement some of the skills needed for the writing exam receive minimal instruction. The writing improvement course is a computer tutorial-based course, which does not evoke positive practice of skills. The activities listed to meet the course objectives are primarily computer tutorial and supplemented work sheets completed in group work. While simple practice may benefit students to some extent, the course has no practice in essay construction or in writing process elements.

Step 5: Comparison from Evaluation Instruments

The chart on the next page is the frequency chart and skill set from the writing Praxis I exam provides examples of questions missed and the skill set needed to answer the question correctly. The writing course instructs limited portions of the multiple-choice questions, and does not instruct essay question skills. The chart on the next page details the evaluation of the writing Praxis I practice exam results. Included in the chart is the question number, primary skill, sub-skill, and frequency-missed columns.

PRAXIS I Practice Writing Test: Coded By Item, Frequency Missed, Availability in Remedial Course, and Sub-skill

Item	Primary Skill*	Frequency missed/of 37	Taught in Remedial Course Y/N	Sub-skill
1	GR	5	Y	Plural
2	GR	20	Y	Subject-verb agreement
3	IWC	12	Y	Mechanics: semicolon
4	IWC	25	N	Idiom use
5	GR	23	Y	Verb form
6	GR	23	N	Incorrect idiom
7	IWC	20	Y	No error
8	IWC	24	Y	Mechanics: apostrophe
9	GR	14	Y	Subject-verb agreement
10	GR	25	Y	Adjective choice
11	IWC	23	Y	Mechanics: capitals
12	SR	26	Y	Verb tense
13	GR	32	Y	Noun agreement
14	IWC	8	Y	Mechanics: comma
15	GR	5	Y	Adjective vs. adverb
16	IWC	28	Y	Word choice
17	IWC	23	Y	No error
18	IWC	23	Y	Word order
19	IWC	19	Y	Word choice
20	SR	29	Y	Phrasing
21	GR	20	Y	Adjective-noun agreement
22	GR	13	Y	Verb tense
23	SR	18	N	Parallelism
24	SR	10	N	Predicate construction
25	GR	13	Y	Noun/pronoun; adj/adv
26	IWC	26	N	Parallelism
27	SR	8	Y	Coordinating conjunction
28	SR	9	Y	Sentence structure
29	SR	16	N	Parallelism
30	SR	9	Y	Conjunction use
31	SR	8	Y	Dangling modifier
32	SR	17	Y	Conjunction agreement
33	SR	21	N	Subject; wordiness
34	SR	22	N	Parallelism
35	SR	15	Y	Double negative
36	IWC	19	Y	Verb tense
37	SR	18	Y	Dangling modifier
38	SR	13	Y	Prounoun use

*The primary skill codes were provided by ETS in The Official Practice Test PPST: Reading

The Praxis I practice exam has three primary skills identified: Grammatical Relationships (GR); Structured Relationships (SR); Idiom and word choice, Mechanics, Correct Usage (IWC)

Step 6: Analysis

The chart provided details that many subjects from the Praxis I writing exam received coverage in the remedial course. Eight question topics do not receive coverage. Eight multiple choice questions would be enough missed to result in not achieving the minimal score required. According to the frequency missed, 50% of the students missed seven of the eight non-instructed questions. Students, according to the frequency of questions missed, consistently missed other questions, which received instruction. One possible reason for missing questions that received instruction could by presentation of the material. Exposure to the format used on the Praxis I would assist students in achieving better scores.

There is not provision for practice on essay questions in the writing improvement course. There is no practice using the writing process in the course.

Practice identifying the parts of speech and sentence structure provides limited skill application, but does not result in skill attainment for use in other settings.

Students need practice in writing and modifying writing, therefore, the computer tutorial course is not sufficient to result in assisting students in achieving minimum required scores.

Step 7: Recommendations/Modifications

Based upon the study findings and curriculum evaluation, a recommendation suggests the elimination of ENG XXX Writing Improvement course as a course for TEP students. A further recommendation includes the creation of a new course incorporating the Praxis I questioning format and Praxis I style writing practice. The existing course

instructs some content, but it does not allow for application of skills or practice in the appropriate skills for the writing course.

ENG 000 Grammar/English

Step 1: Behavioral Objectives

- Demonstrate their ability to utilize English grammar skills.
- Demonstrate necessary skills for effective written communication and demonstrate their writing skills.
- Demonstrate critical thinking about written communication from a Christian worldview.

Step 2: Assignments Designed to Evoke Behaviors

- Sentence writing
- Paragraph writing
- Daily quizzes on textbook chapters

The syllabus states that students will cover a textbook chapter each week with daily quizzes on the material. Students will also write paragraphs based from textbook assignments. Students will read two novels and have unit tests over the information in each book.

Step 3: Evaluation Instruments

- Frequency of missed questions on Praxis I practice exams (Reading and Writing)
- Coded skills from Praxis I practice guide and skills coded by researcher

- Praxis I Objectives provided by ETS study guide
- Textbook from the course, *Dolphin Writer, book 1*
- Syllabus from course

The frequency chart and coded skills provided a base of knowledge needed to successfully achieve minimal scores on the Praxis I exams. The Praxis I study guide provided a list of skills tested. The textbook, using the course syllabus details the topics, skills, and content covered in the course.

Step 4: Results

Based upon the objectives provided by ETS of information tested on the Praxis I exam, two distinct conclusions are evident. First, instruction of reading skills does not occur in ENG 000 Grammar/English. Second, the skills needed for the writing exam receive minimal instruction. The grammar/English course focuses on the parts of speech and minimal writing elements. The textbook does provide practice with skills, but the practice is isolation and likely does not transfer well to other courses. The activities listed to meet the course objectives are primarily assignments from the textbook with little outside practice. While simple practice may benefit students to some extent, the course has extremely limited practice in writing process elements. There is no instruction on essay writing.

Step 5: Comparison from Evaluation Instruments

The chart on the next page is the frequency chart and skill set from the reading Praxis I exam provides examples of questions missed and the skill set needed to answer the question correctly. The chart on the next page details the evaluation of the reading

Praxis I practice exam results. Included in the chart is the question number, primary skill, sub-skill, and frequency missed columns. The frequency chart and skill set from the reading Praxis I exam is the most simple to evaluate. No reading strategies or practice in reading for information takes place in the course. Therefore, reading needs some type of course work added to the existing course or creation of a new course.

PRAXIS I Practice Reading Test: Coded By Item, Frequency Missed, Availability in Remedial Course, and Sub-skill

Item	Primary Skill*	Frequency missed/of 37	Taught in Remedial Course Y/N	Sub-skill
1	LC	12	N	Main Idea
2	CIC	19	N	Inferential Reasoning
3	CIC	14	N	Inferential Reasoning
4	LC	20	N	Main Idea
5	LC	29	N	Supporting Idea
6	LC	21	N	Main Idea
7	CIC	16	N	Inferential Reasoning
8	LC	9	N	Supporting Idea
9	CIC	30	N	Inferential Reasoning
10	LC	15	N	Main Idea
11	LC	23	N	Organization Transition
12	CIC	18	N	Generalization
13	CIC	15	N	Generalization
14	LC	29	N	Vocabulary
15	LC	12	N	Organizational relationships
16	CIC	17	N	Argument Evaluation
17	LC	9	N	Main Idea
18	LC	18	N	Main Idea
19	CIC	26	N	Argument Evaluation
20	LC	15	N	Supporting Idea
21	LC	14	N	Vocabulary
22	LC	27	N	Organizational relationships
23	CIC	20	N	Argument Evaluation
24	LC	5	N	Main Idea
25	CIC	14	N	Generalization
26	LC	17	N	Organizational relationships
27	CIC	9	N	Inferential Reasoning
28	LC	13	N	Main Idea
29	CIC	16	N	Generalization
30	CIC	12	N	Inferential Reasoning
31	CIC	22	N	Inferential Reasoning
32	CIC	13	N	Generalization
33	LC	28	N	Main Idea
34	CIC	29	N	Inferential Reasoning
35	CIC	15	N	Generalization
36	CIC	14	N	Argument Evaluation
37	CIC	32	N	Inferential Reasoning
38	LC	16	N	Supporting Idea
39	CIC	27	N	Argument Evaluation
40	CIC	15	N	Inferential Reasoning

*The primary skill codes were provided by ETS in The Official Practice Test PPST: Reading

The Praxis I practice exam has two primary skills identified: Literal Comprehension (LC); Critical and Inferential Comprehension (CIC)

The following chart is the frequency chart and skill set from the writing Praxis I exam provides examples of questions missed and the skill set needed to answer the question correctly. The writing course instructs limited portions of the multiple-choice questions, and does not instruct essay question skills. The chart on the next page details the evaluation of the writing Praxis I practice exam results. Included in the chart is the question number, primary skill, sub-skill, and frequency missed columns.

PRAXIS I Practice Writing Test: Coded By Item, Frequency Missed, Availability in Remedial Course, and Sub-skill

Item	Primary Skill*	Frequency missed/of 37	Taught in Remedial Course Y/N	Sub-skill
1	GR	5	Y	Plural
2	GR	20	Y	Subject-verb agreement
3	IWC	12	Y	Mechanics: semicolon
4	IWC	25	N	Idiom use
5	GR	23	Y	Verb form
6	GR	23	N	Incorrect idiom
7	IWC	20	Y	No error
8	IWC	24	Y	Mechanics: apostrophe
9	GR	14	Y	Subject-verb agreement
10	GR	25	Y	Adjective choice
11	IWC	23	Y	Mechanics: capitals
12	SR	26	Y	Verb tense
13	GR	32	Y	Noun agreement
14	IWC	8	Y	Mechanics: comma
15	GR	5	Y	Adjective vs. adverb
16	IWC	28	Y	Word choice
17	IWC	23	Y	No error
18	IWC	23	Y	Word order
19	IWC	19	Y	Word choice
20	SR	29	Y	Phrasing
21	GR	20	Y	Adjective-noun agreement
22	GR	13	Y	Verb tense
23	SR	18	N	Parallelism
24	SR	10	N	Predicate construction
25	GR	13	Y	Noun/pronoun agreement; adj/adv
26	IWC	26	N	Parallelism
27	SR	8	Y	Coordinating conjunction
28	SR	9	Y	Sentence structure
29	SR	16	N	Parallelism
30	SR	9	Y	Conjunction use
31	SR	8	Y	Dangling modifier
32	SR	17	Y	Conjunction agreement
33	SR	21	N	Subject; wordiness
34	SR	22	N	Parallelism
35	SR	15	Y	Double negative
36	IWC	19	Y	Verb tense
37	SR	18	Y	Dangling modifier
38	SR	13	Y	Prounoun use

*The primary skill codes were provided by ETS in The Official Practice Test PPST: Reading

The Praxis I practice exam has three primary skills identified: Grammatical Relationships (GR); Structured Relationships (SR); Idiom and word choice, Mechanics, Correct Usage (IWC)

Step 6: Analysis

The reading chart provided details that no reading instruction of any kind takes place. The sub-skills identified on the chart give insight into the topics and skills a course needs to include in order to assist TEP students.

The chart provided details that many subjects from the Praxis I writing exam received coverage in the remedial course. Eight question topics do not receive coverage. Eight multiple choice questions would be enough missed to result in not achieving the minimal score required. According to the frequency missed, the non-instructed topics from eight questions are missed by at least 50% of the students on seven of the questions. Students, according to the frequency of questions missed, consistently missed other questions, which received instruction. One possible reason for missing questions that received instruction could by presentation of the material. The format used on the Praxis I is not exposed to students.

The Grammar/English course did not provide essay question practice. There is no practice using the entire writing process in the course. Limited paragraph writing is all that takes place that could offer improvement in student essay construction.

Practice identifying the parts of speech and sentence structure provides limited skill application, but does not result in skill attainment for use in other settings.

Students need practice in writing and modifying writing, therefore, the grammar/English course is not sufficient to result in assisting students in achieving minimum required scores.

Step 7: Recommendations/Modifications

Based upon the study findings and curriculum evaluation, it is recommended that the ENG 000 Grammar/English course be significantly modified for use as a course for TEP students. An addition to the course used to incorporate the Praxis I questioning format and writing practice is recommended. The existing course instructs some content, but it does not allow for application of skills or practice in the appropriate skills for the writing test. An addition of practice essay questions weekly and practice with correctly writing samples should be incorporated.

The reading skills that are required to achieve minimal scores on the Praxis I reading exam need a course designed in learning reading strategies and application of those strategies. Neither of these was provided in the existing course. The reading content and skill base needed would need a new course designed specifically for reading. Fluency and reading for content needs instruction to assist students in reading test scores. Students also need a base in how to read questions, take tests, and reading for comprehension. There is no possible way to incorporate all of these skills into one course.

Therefore, the suggestion for assistance for TEP students in meeting Praxis I scores is the deletion of ENG XXX (Writing Improvement) from the remedial format for TEP students. It is also suggested that ENG 000 (Grammar/English) course be reorganized to include Praxis I skill sets and questioning format. In addition to altering ENG XXX, it is suggested that a reading course be added. The reading course should be designed to specifically target Praxis I tested skills and teacher education content areas to enhance TEP student achievement.

MAT XXX Math Improvement

Step 1: Behavioral Objectives

- Demonstrate the ability to solve math problems.
- Demonstrate the ability to solve word problems at the college entrance level.
- Demonstrate the ability to solve problems using proportion and percent.
- Demonstrate the ability to solve algebraic problems at college entrance level.
- Demonstrate a level of at least 70% on tutorial programs in the area of mathematics.
- Demonstrate the basic computer skills needed to run the tutorials.

Step 2: Assignments Designed to Evoke Behaviors

- Computer tutorial completion

The syllabus states, "The instructor uses primarily a computer tutorial program." According to the syllabus, supplemental materials are not used.

Step 3: Evaluation Instruments

- Frequency of missed questions on Praxis I practice exams (mathematics)
- Coded skills from Praxis I practice guide and skills coded by researcher
- Praxis I Objectives provided by ETS study guide
- Syllabus from course

The frequency chart and coded skills provided a base of knowledge needed to successfully achieve minimal scores on the Praxis I exams. The Praxis I study guide provided a list of skills tested.

Step 4: Results

Based upon the objectives provided by ETS of information tested on the Praxis I exam, the mathematics course MAT XXX does cover most of the content tested on the Praxis I math exam. It is noted, however, that computer tutorial is not the best practice for remedial students. In a computer tutorial setting, guessing is a valid way to achieve correct answers. Unless a student knows how to apply a learned math skill, computer practice cannot pinpoint problems in computations or if a certain skill is understood. It is also noted that the question format on the Praxis I mathematics test is not used in the course.

Step 5: Comparison from Evaluation Instruments

The frequency chart and skill set from the mathematics Praxis I exam was easily interpreted. Based upon the syllabus, the tutorial covered all content except data analysis. It is possible that the component of mathematics word problems may have some analysis involved; the skill is not specifically listed as a skill receiving instruction.

PRAXIS I Practice Mathematics Test: Coded By Item, Frequency Missed, Availability in Remedial Course, and Sub-skill

Item	Primary Skill*	Frequency missed/of 33	Taught in Remedial Course Y/N	Sub-skill
1	MA	5	N	Data analysis
2	NK	18	Y	Numbers
3	MA	15	N	Data analysis
4	GR	18	Y	Geometry
5	GR	19	Y	Geometry
6	UA	11	Y	Algebra
7	MA	21	N	Data analysis
8	GR	10	Y	Geometry
9	UA	10	Y	Algebra
10	NK	19	Y	Numbers
11	UA	22	Y	Algebra
12	MA	15	Y	Probability
13	NK	17	Y	Operations
14	GR	23	Y	Geometry
15	NK	18	Y	Operations
16	NK	23	Y	Numbers
17	GR	5	Y	Geometry
18	MA	12	N	Data analysis
19	GR	24	Y	Measurement
20	MA	11	Y	Probability
21	NK	20	Y	Numbers
22	UA	30	Y	Algebra
23	NK	11	Y	Operations
24	UA	26	Y	Algebra
25	NK	31	Y	Operations
26	MA	21	Y	Probability
27	NK	6	Y	Operations
28	MA	25	Y	Probability
29	NK	25	Y	Operations
30	GR	25	Y	Measurement
31	NK	26	Y	Operations
32	MA	31	N	Data analysis
33	NK	22	Y	Numbers
34	UA	25	Y	Algebra
35	NK	32	Y	Operations
36	MA	30	N	Data analysis
37	UA	29	Y	Algebra
38	GR	26	Y	Geometry
39	GR	28	Y	Measurement
40	UA	17	Y	Algebra

*The primary skill codes were provided by ETS in The Official Practice Test PPST: Mathematics
The Praxis I practice exam has four primary skills identified: Numerical Knowledge (NK); Understanding Algebra (UA); Geometric Relations (GR); Math Applications (MA)

Step 6: Analysis

The chart provided details that almost all mathematics content on the Praxis I received coverage in the remedial courses. The six questions that were not covered in the remedial course were related to data analysis. Three of the data analysis questions were missed by more than 50% of the students. The remaining three questions were missed by significantly less than 50%. One possible reason for missing questions that received instruction could by presentation of the material. Students are not exposed to the question format used on the Praxis I.

A computer based tutorial does not give an opportunity to analyze student skills, nor to identify if a skill is learned or simply guessed. The computer tutorial would be an excellent companion to the general mathematics course, as long as the computer practice is based upon content instructed in the general mathematics course. It is also recommended that sample test questions from Praxis I mathematics practice materials be used in the course to prepare students for the format.

Step 7: Recommendations/Modifications

Based upon the study findings and curriculum evaluation, it is recommended that the two remedial courses remain taken in conjunction with one another, as long as a connection is made between instruction and practice. It is also recommended that Praxis I practice mathematics questions be introduced in the course to prepare students for the format.

Project Evaluation

A white paper was created to offer suggestions to improve the remedial courses. In order to evaluate the success of the recommendations, collection of several data sets are necessary.

The data sets required are:

- **Practice Praxis I test scores**
- **Actual Praxis I test scores**
    - Successful student suggestions
    - Unsuccessful student suggestions
- **Grades of TEP students in the new remedial course**
    - Practice test scores of students in the course pre and post

Practice Praxis I test scores: Obviously, the practice Praxis I test scores yields valuable information. Comparison of practice test scores before and after the course could give an indication of whether or not the student scores improved after the course began. The practice tests allow TEP to know if the students are prepared to take the actual test.

Actual Praxis I test scores: If students achieve minimal requirements on the Praxis I and subsequently admitted to TEP, the problem facing the local university will be alleviated. The credit for assisting students may not be simply the remedial course. Students must be honest regarding the course and other study assistance the students use. We will give a short questionnaire to students who have taken the actual Praxis I test with suggestions regarding what they studied, did not study, what resources they used, etc.

This questionnaire will be administered to both successful and unsuccessful students. These suggestions could provide valuable insight into expectations on the Praxis I and what the students actually encountered. Asking successful students to provide a list of resources they found helpful would assist other students.

Grades of TEP students in the new remedial course: The final grades of students who took the remedial course will provide information regarding how the students do with material and formatting from Praxis I study materials. A practice Praxis I pretest will be administered on the first day of the course, a posttest will be administered during finals week of the semester. If the practice Praxis I scores improve or growth is evidenced, it will provide information on the material taught to the students being accurate. Student questionnaires will be administered to the students in the course to offer suggestions or areas they did not think were adequately instructed. The course instructor to assist in determining additions/substitutions/valuable resources to improve the course will moderate a large group discussion. Opportunity for the faculty to express concerns and ask questions will take place at a TEP board meeting.

Assimilation of the data collected will determine the success of the course and the project. It is unrealistic to expect the course to make huge differences upon its induction into the course catalog. Differences in students, differences in student needs, and simply instructor preferences will require adjustments to improve results. Replication of my study should help to keep continued improvements moving forward. Now that the initial study has taken place, it will be much easier to continue to monitor

course alignment with tested information. The Practice test data will give valuable insight into student abilities regarding success in the TEP.

Sample Student Questionnaire:

Please do not write your name on this questionnaire, all information from this questionnaire will be used to improve Praxis I preparedness.

1. How many times have you taken the Actual Praxis I exam?
    - 1
    - 2
    - 3
    - More than 3
2. How many Practice Praxis I exams have you taken?
    - 1
    - 2
    - 3
    - More than 3
3. What were your scores?
    - Passed on the first try
    - Passed on a subsequent try
    - Did not pass
4. What kinds of remedial assistance have you received (circle all that apply)?
    - Tutoring (on campus)
    - Tutoring (off campus)
    - Private tutoring
    - Study groups
    - Praxis I official study guides
    - Praxis I website study materials
    - Course work
    - Other: Specify _____

5. What types of instructional methods did your teacher use (circle all that apply)?
   - Questioning strategies
   - Drill-and-skill
   - Lecture
   - Group work
   - Other: Specify _____

6. Did/Do you feel adequately prepared to pass the Praxis I

   YES NO Don't Know

7. Please list suggestions to improve this course:

8. Please list suggestions to eliminate from this course:

9. Please list things you have found helpful in studying for the Praxis I:

10. Please list things you have NOT found helpful in studying for the Praxis I: